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U.S. Scanner News

A Magazine for the Scanner Hobbyist

Volume 9, Number 9 – September/October 1996

Printed in the USA

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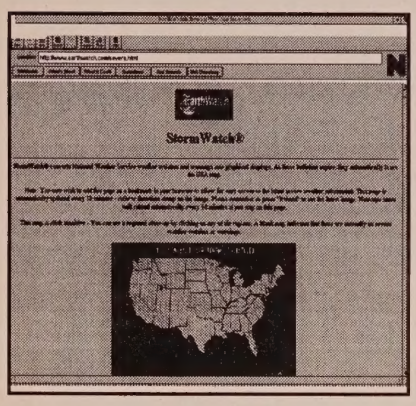

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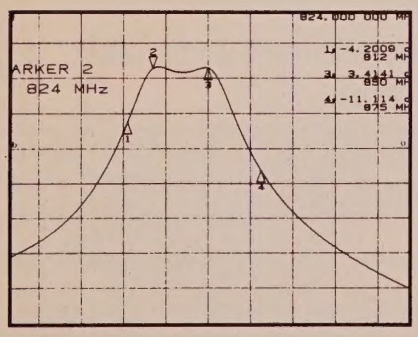

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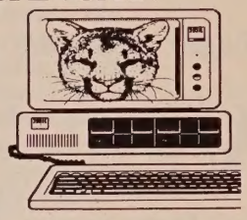

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Firefighters In Action

Every day local firefighters put their lives on the line. These brave people are from the Fort Worth, Texas Fire Department.

Photo by Bill Carter

U. S. GOVERNMENT

Department Of Agriculture: U.S. Forest Service

by Roger Cravens

When I began doing research for this article, I wanted to concentrate my efforts on the U.S. Forest Service. But after discovering that agency is under the authority of the Department of Agriculture, I decided that it would be much more interesting to simply combine both of these organizations.

The Department of Agriculture is one of this nation's oldest agencies. It was created by an act which took effect on May 15, 1862 and was administered by a Commissioner of Agriculture until 1889. Another act, enacted February 9, 1889, enlarged and outlined the powers and duties of this Department and made it the eighth executive department of our federal government.

The Departments main responsibilities are: to improve and maintain farm income; develop and expand markets abroad for our agriculture products; help curb and cure poverty, hunger, and malnutrition; enhance the environment and maintain production capacity; protect the soil, water, forests and other natural resources; provide rural development, credit and conservation programs; carry out agriculture research, and provide food inspection and grading services.

There are a few main undersecretaries who provide exceptionally important services.

1. **Under Secretary for Farm and Foreign Agriculture Services**
2. **Under Secretary for Small Community and Rural Development**
3. **Under Secretary for Food, Nutrition, and Consumer Services**
4. **Assistant Secretary for Marketing and Regulatory Programs**
4. **Assistant Secretary for Natural Resources and Environment** (U.S. Forest Service falls under this Assistant Secretary
5. **Under Secretary for Research, Education, and Economics**

The U.S. Forest Service

The U.S. Forest Service was created by the Transfer Act of February 1, 1905, which transferred the federal forest reserves and the responsibility for their management from the Department of the Interior to the Department of Agriculture. The forest reserves were established by the President from the public domain under authority of the Creative Act of March 3, 1891. There are a few other acts, but this particular one was the most important in that it allowed for the creation of the Forest Service.

Their most public responsibility is seen virtually every spring and summer throughout the west, particularly in California during dry season. But that's just the beginning-the U.S. Forest Service provides for the continuing flow of natural resource goods and services to help meet the needs of the nation, and to contribute to the needs of the international community. This agency provides for the sustained flow of renewable resources such as outdoor recreation, forage, wood, water, wilderness, wildlife, and fish in a combination that best meets the needs of society now and in the future.

One of their more impressive and important responsibilities provides national leadership and financial and technical assistance to non-federal forest landowners, operators, processors of forest products, and urban forestry interests. Through its cooperative state and private forestry programs, the Service protects and improves the quality of air, water, soil, and open space and encourages uses of natural resources on non-federal lands that best meet the needs of the nation while protecting our environment. There are also many cooperative programs which are carried out through each states foresters, or equivalent state offices, that receive grant funding under the Cooperative Forestry Assistance Act of 1978.

Trying to maintain and protect our nation's forests is both a huge responsibility as well as challenge. These challenges present themselves primarily in the form of forest fires each year. Forest fires are created primarily by two sources: accidental man-made (camping fires and cigarettes) and natural sources such as lightning. Then you have a few absolute nut-cases who start these fires deliberately and end up burning acres and acres of land and houses before the fires can be extinguished.

This winter while skiing or next summer while you're out enjoying this nation's forests, keep the actual and real "Smokey Bears" in mind. They have a difficult, as well as extremely important, role to perform. Be sure to take your scanners with you. You never know when fellow skiers might run into trouble, someone gets lost in our forests, or most importantly, if there is a wildfire coming your way. Your scanner, while providing hour after hour of entertainment, might serve a much more important function. It could save your life, or someone else's.

The tables shown are not designed to be an all-encompassing listing. I have not taken the opportunity to ask

any forest rangers what frequencies they use. But it would seem to me on the face of it that they would have no problems with providing you those that they use for your particular area. Like the FAA and the airport frequencies, it would appear to me these frequencies were not intended to be a national secret similar to the national law enforcement frequencies used by the FBI, DEA, or BATF. There are so many frequencies, it would take three editions of USSN to publish all the combinations for the Forest Service. That is why I recommend you simply call your local Forest Service office in your area and ask them. It would probably be best to talk to the area or office supervisor. But you will probably get a lot more information and certainly an attitude of openness if you pay a personal visit and just honestly tell them why you want them. And I would certainly emphasize that you're not going to be a "Problem Child" with your scanner, but simply want to be informed of what is occurring while you're in their park. Even criminals hide in forests, and you certainly want to avoid the area where the forest rangers are looking. I'm sure you can devise a similar story (but true) for your local area.

Until next month, good hunting and good signals.

USSN

Department of Agriculture

(PL Tone(s): 103.5/107.2)

Repeater Output (Transmit)	Repeater Input (Receive)	Channel	General Description of Use
171.5250		02	Nationwide Misc Channel
164.1250	166.1250	05	Inspector General (in some areas)
164.6250			Department of Agriculture (Simp)
164.7000			Department of Agriculture (Simp)
164.8250	164.1250		General & Misc Operations
164.9375			Department of Agriculture (Simp)
166.1250	164.6250		General & Misc Operations
168.1750	168.6750	06	Inspector General (in some areas)
168.2000			General & Misc Operations (Sometimes Tactical)
168.2500			General & Misc Operations (Sometimes Tactical)
168.6000			General & Misc Operations (Sometimes Tactical)
168.6250	168.0250		General & Misc Operations
168.6750	168.0750		General & Misc Operations
168.6750	168.1750		General & Misc Operations
169.0750	171.0750		Soil Conservation Service
169.9250	170.5750		Work Centers & Various Labs
170.6000	172.4000		Soil Conservation Service
171.0750			Soil Conservation Service
171.1000	169.4750		Soil Conservation Service
171.5625		01	Agriculture Inspection Services
171.5625	173.7625	03	General Operations (Unit to Unit)
172.2250			Soil Conservation Service
172.2250			Soil Conservation Service
172.5750		04	Interagency Comm. Network
411.3000	415.3000		Federal Grain Inspection Service
411.3000			Federal Grain Inspection Service
415.2250	411.2250		General & Misc Operations
415.2500	411.2500		General & Misc Operations
415.2750	411.2750		General & Misc Operations
415.3000	411.3000		General & Misc Operations

U.S. Forest Service

(Boise Interagency Fire Center)
(Managed by both U.S. Forest Service and Bureau of Land Management)

Repeater Output (Transmit)	Repeater Input (Receive)	Channel	General Description of Use
168.7000	170.9750		Command Net 1
168.1000	170.4500		Command Net 2
168.0750	170.4250		Command Net 3
169.8750	172.2500		Command Net 4
169.1750	171.5000		Command Net 5
417.3000	411.8250	1	Incident Command System/Cnters
417.3500	411.3500	2	Incident Command System/Cnters
417.5000	411.8750	3	Incident Command System/Cnters
417.8000	411.9250	4	Incident Command System/Cnters

U.S. Forest Service

164.1250			Simplex
164.6000	165.4125		
166.6750			Simplex
168.1750			Simplex
168.1750			Simplex
168.6250	168.0250		
168.6250			Simplex
168.6500			Simplex
168.6750			Simplex
168.7750	168.1750		
168.7750			Simplex
169.1500			Simplex
169.2000			Simplex
169.9000			Simplex
170.0000			Simplex
170.4250			Simplex
170.4250			Simplex
170.5500			Simplex
171.5000			Simplex

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ANTENNAS

The Dipole

An Antenna Of A Thousand Faces

by W. Clem Small, KR6A, CET

If there is one antenna design which could be called the "basic" antenna design of the radio world it must surely be the time-honored, half-wavelength dipole (fig. 1A). This is the antenna which Heinrick Hertz, the first person to scientifically demonstrate the existence of radio waves, used with his spark-gap transmitter in those early investigations. Hertz's "electromagnetic waves" or "radio waves" were popularly called "Hertzian waves" in the early days of wireless, and they are still very important to us today. After all, they are the means by which scanner waves reach our scanning antennas!

The Halfwave Dipole and Its Relatives

In addition to being a "workhorse" of the radio communications industry for decades, the dipole antenna has been the basis for the development of a number of other antenna designs. For instance, Guglielmo Marconi, the "Father of Radio," developed the quarterwave grounded vertical antenna from Hertz's halfwave dipole by orienting one half of the dipole to be a vertical element. He then removed the dipole's other half, and substituted a ground connection for it. Today, this antenna design is the basic skywire for almost every non-directional, AM broadcast station in the United States, and perhaps in the world.

The very popular quarterwave groundplane antenna came along much later than the grounded, quarterwave vertical antenna, but this antenna too can be shown to derive from a vertically-oriented halfwave dipole (fig. 2A). To do this, begin by splitting the lower half of the dipole into several elements (fig. 2B) each of which is identical in length to the original lower half of the dipole. Then pull these several elements out at the bottom and upwards to form a skirt which starts at the bottom of the top dipole half (fig. 2C). Once this derivation is complete the antenna's feedline is routed up through the skirt from below rather than in from the side, as was true with the dipole from which it was derived.

There are many interesting variations on the basic, center-fed, halfwave dipole design (fig. 1A). These include the off-center fed Windom (fig. 3A) and the end-fed Zepp (fig. 3B). The dipole also furnishes the basic "building block" for the popular Yagi-Uda beam (fig. 4A), and cubical quad beam antennas. The dipole elements in a Yagi-Uda are obvious because each element in that antenna looks just like a dipole, and is close in length to a half wavelength.

The relationship of the square loops of the cubical quad (fig. 4B) to the halfwave dipole antenna is less obvious, so let's look more closely at that. The square element design of the cubical quad was derived from a halfwave folded-dipole element by Clarence Moore to solve a problem of antenna damage due to corona discharge at the shortwave station where he was an engineer. Moore opened up the wires of the folded dipole to form a square quadrilateral (fig. 4C and D).

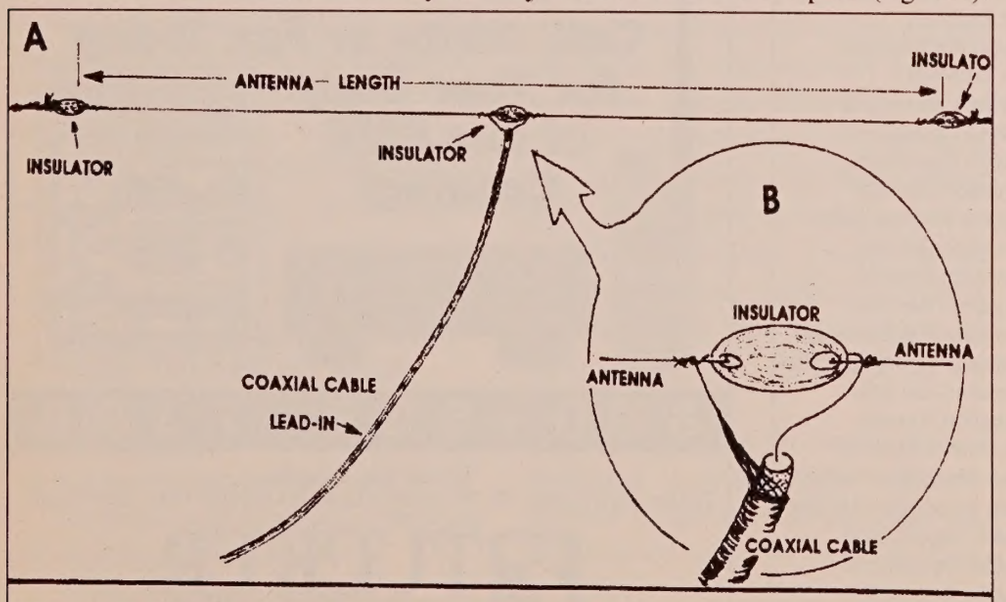

FIG. 1. A halfwave dipole (A), insulator connection detail (B).

The original cubical quad (fig. 4B) antenna was made using two of these quadrilateral elements, and this formed the outline of a cube: thus the name "cubical quad."

Dipole are also designed with lengths other than the common half wavelength. Dipoles with overall lengths as short as a quarter wavelength, sometimes called the "Real McCoy Antenna," are useful antennas. Although these shorter dipoles have less gain than a full halfwave dipole, they give essentially the same reception pattern as the halfwave version. Extending the overall length beyond a half wavelength, done properly, can give useful increased gain, and a more directional pattern to the dipole antenna. Examples of these longer dipole designs include the extended double-Zepp, and the Franklin, or collinear dipole designs.

Frequency of Operation

As its name implies, the halfwave dipole is designed with a length that is a half wavelength at a specific frequency; that frequency is the frequency at which the antenna is to be utilized. To determine this length we usually use the equation:

Length (in feet) = 468/frequency in MHz.

or

Length (in meters) = 143/frequency in MHz.

Many scanner buffs find that a dipole can be utilized at frequencies far removed from the frequency for which it was designed. This is even more true on the HF band, and on lower frequencies, than at VHF and UHF. Almost any antenna, the dipole included, will function to some degree at frequencies other than its design frequency. On the other hand, the antenna will give more signal output at its design frequency than at other frequencies. A dipole may be useful over a wide portion of the RF spectrum for receiving strong signals, but for weaker signal work a dipole performs best utilized at, or near, its design frequency.

Making Your Own Dipoles at Various Frequencies

You can easily make your own halfwave dipole for whatever frequency you choose. This design works well from the HF band on through the microwave region. Much more care is needed in constructing the antenna for microwave than for the lower frequencies, but the design ideas are basically the same.

As we go higher in frequency of operation, the element lengths for thinner (i.e., wire) elements remain at approximately that obtained by using the length equations given above, but the proper length for larger diameter elements is shortened a bit. For instance, changing from a 1/16 inch diameter wire element to using a 1/2 inch diameter tube as the element for frequencies up to 50 MHz has essentially no effect on the length the antenna should be (less than 1%), where as at 400 MHz elements made of the larger diameter should be about 1% shorter than elements made of the 1/16 inch wire. Above 1000 MHz (1 GHz) this difference changes to about 2%. Many antenna builders just ignore this small difference because various construction and siting differences can have greater effects on the antenna's frequency response than the effect of these small length differences.

To make your dipole, first cut the elements to length. The antenna has a break at its middle with a center insulator there to hold the two halves together. If the elements are wire, remember to leave enough extra length to bend the

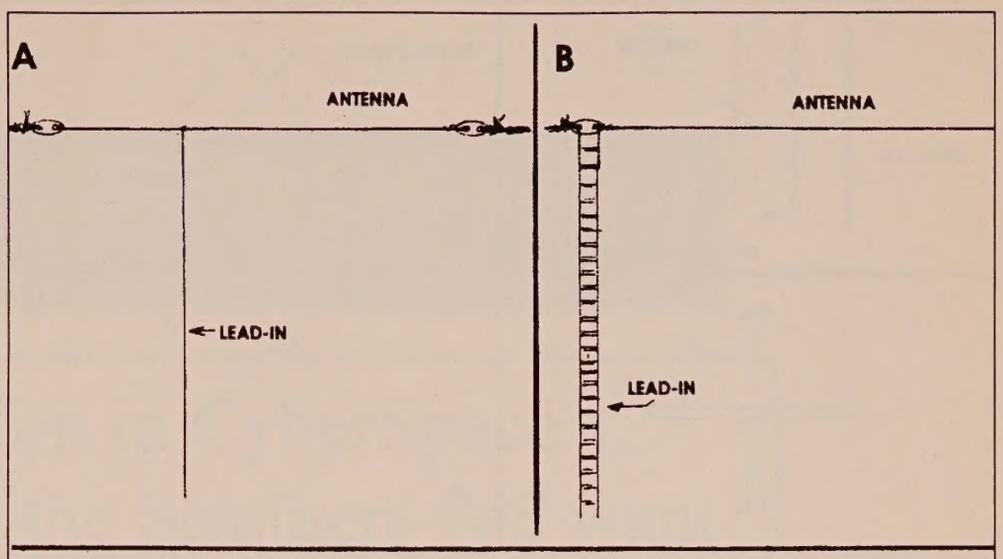

FIG. 3. An off-center fed Windom antenna (A), and an end-fed Zepp antenna (B).

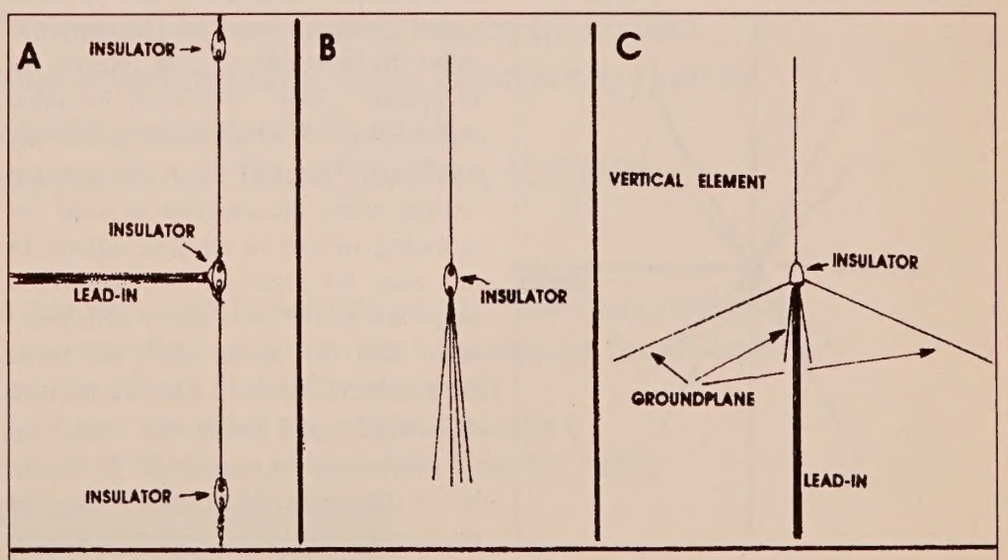

FIG. 2. A vertically-oriented halfwave dipole antenna (A), and stages in deriving a quarterwave groundplane antenna from the vertical dipole (B and C).

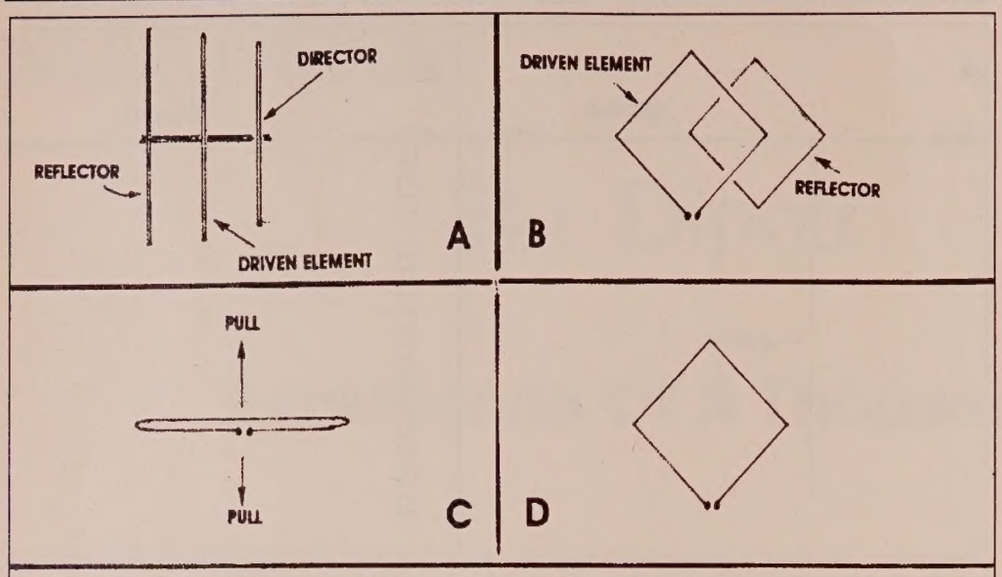

FIG. 4. A Yagi-Uda beam antenna (A), a cubical quad beam antenna (B), and the derivation from a folded dipole element (C) to a quad loop element (D).

wire through the insulator, and then back around itself as shown in fig. 1B. The antenna's length, as given by the length equation, is that of the completed antenna, not of the wire before it is wrapped around the insulators. This means that the extra wire which wraps around the insulators does not contribute to the antenna's overall length.

If you are using tubing for the elements you will likely want to obtain a discarded television antenna, take it apart, and adapt its tubing to suit your needs. In this case you will use the center insulator from the TV antenna just as it is on that antenna.

To insure best reception mount the completed antenna as high and in-the-clear as is practical. Avoid mounting it near other objects, especially those with metal in them. For VHF-UHF scanning we are often told that the antenna should be mounted vertically to obtain vertical polarization, the most prominent signal polarization for signals on those bands. On the other hand, as explained in my April column, tilting the antenna at 45 degrees from the vertical on these bands is said to give a diversity-gain of 3 dB above losses caused by using the slanted antenna polarization.

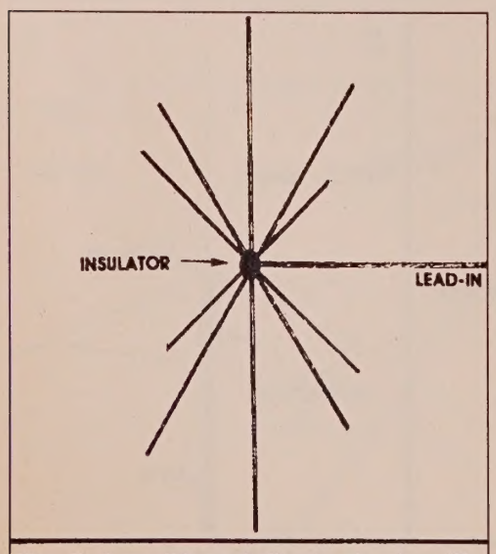

Fig. 5. A multiband dipole made with elements cut for several different frequencies.

On the HF bands the typical dipole orientation is horizontal. Horizontally-mounted dipoles have a null, or direction of least responsiveness to signals, directly off the end of each element. Due to this, it is best to orient a horizontal dipole so that its two ends point in directions of little interest for reception. For vertically-mounted dipoles there is a null pointing directly overhead. This null is of no concern except when the antenna is used for scanning aircraft or satellite signals. In any case, for practical antennas, these nulls are never completely unresponsive, and so there will be some reception by a dipole antenna even to signals in its null directions.

Your lead-in cable will, no doubt, be 50 ohm coax. This will match your receiver's antenna input impedance, but cause a slight mismatch with the antenna's 72 ohm impedance. Using 72 ohm coax will cause the same slight mismatch to occur at the receiver coax connection rather than at the cable receiver connection. To be theoretically pure we could use a 1.5:1 balun between the antenna and line, to avoid this mismatch, and also avoid some pattern distortion. Baluns with a 1.5:1 ratio are hard to find, and directions for making receiving baluns are not that widely available. On the other hand, at VHF and higher frequencies, the use of a moderate-quality balun may cause more signal loss than it cures. At any rate, we usually find that using the antenna without a balun produces satisfactory reception. If you choose to use a balun be sure that it has a transforming ratio of 1.5:1, and is designed to cover the frequencies for which you will attempt to use it. If 72 ohm coax is to be used, the balun's low-impedance windings should attach to the receiver's antenna input connector and high-impedance winding to receiver end of the coax. If 50 ohm coax is used the balun's low-impedance winding is attached to the-antenna-end of the coax, and its high-impedance winding to the antenna's output terminals.

Making a number of dipoles, each cut to a different frequency, and attaching them all to the same feedline is one means of making a multiband antenna (fig. 5). For instance, you might make dipole elements for the 138 to 144 MHz government/military band, for the 144 to 148 ham band, the 150 to 174 VHF-high business band, and the 225 to 400 MHz military band, and incorporate them in one multiband antenna. There is some interaction between the various elements in these multiband dipoles, so that the lengths are no longer quite correct. Nevertheless, this technique often gives decent results to "homebrew" an inexpensive multiband antenna. For best results, using aluminum tubing, as from an old TV antenna, gives a dipole a somewhat wider bandwidth, allowing the dipole to function more effectively over a broader segment of frequencies each side of its design frequency.

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PUBLIC SAFETY COMMUNICATIONS

Grand Canyon National Park

by Ed Muro

Located entirely in northern Arizona, the Grand Canyon National park encompasses 277 miles of the Colorado River and adjacent uplands. One of the most spectacular examples of erosion anywhere in the world, Grand Canyon is unmatched in the incomparable vistas it offers to visitors on the rim.

The park has close to five million visitors a year. Peak season runs from April through October; winter holiday weekends are also crowded. Summers are extremely crowded.

Mailing Address:
Grand Canyon National Park
P.O. Box 129
Grand Canyon, AZ 86023
Telephone: All general park inquiries should be directed to (520) 638-7888.
Operating Hours and Seasons:
The South Rim is open 24 hours a day, 365 days a year. The North Rim is closed from late October to mid-May.

The South Rim is 7000 feet above sea level, which means snow in winter and cool nights even in summer. Inner canyon hiking (below the rim) is another story, however: summer temperatures along the Colorado River at the canyon bottom can reach 120 degrees F. The North Rim is 8000 feet above sea level and can receive snow throughout most of the year. Weather is particularly changeable in spring and fall.

Grand Canyon National Park South Rim Patrol Radio Frequencies

Ch 1	172.45 R (171.75 Input)	Hopi Point Repeater
Ch 2	172.45	(Simplex)Car-Car
Ch 3	172.45 R	Desert View & Mt Emma Rptrs (PL 127.3)
Ch 4	168.350	NPS Tactical
Ch 5	172.575 R (169.675 Input)	Fire/SAR–Hopi Point Rptr.
Ch 6	172.575 (simplex)	Fire/SAR–Car-Car
Ch 7	172.600	Tactical
Ch 8	153.89 R (154.445 Input)	Fred Harvey–Hopi Pt. Rptr.
Ch 9	156.12 R (151.04 Input)	Grand Canyon Airport (PL 131.8) Fire/Rescue
Ch 10	171.625 R (172.475 Input)	Glen Canyon NRA–Lee Ferry Rptr (PL 131.8)
Ch 11	169.90	Kaibab National Forest Fire Net (PL 103.5)
Ch 12	151.445	Arizona Fish & Game (Car-Car) (PL 88.5)
Ch 13	155.49	Sheriff Car-Car
Ch 14	155.49 (159.210 Input)	"Ch- Victor–Hopi Pt. Rptr.
Ch 15	155.49 (159.210 Input)	"Ch- Baker–Bill Williams Rptr.
Ch 16	154.280	Fire Mutual Aid

Grand Canyon Village (South Rim) is located 60 miles north of Interstate 40 at Williams via highway 64, and 80 miles northwest of Flagstaff via highway 180. Only ten miles from rim to rim as the crow flies, the North Rim is 215 miles (about 4 1/2 hours) from the South Rim by car. The North Rim is 44 miles south of Jacob Lake, AZ, via highway 67.

Emergency Services Equipment
(as of 1995)

Chief of Emergency Services	1994 Jeep Cherokee
SAR Coord.	1995 Ford Bronco
Fire Chief	1989 Chevrolet 4WD Pick-up
Rescue 2	1977 Chevrolet Step Van
Rescue 3	1977 Dodge 4WD Military Surplus Ambulance
Engine 1	1993 KME
Engine 2	1969 International Harvester
Engine 3	1983 Hendrickson
Engine 4	(Unknown- Replaced in 1995)
Medic 1	1994 Ford-Wheeled Coach Ambulance
Medic 2	1983 Ford-Collins Van Ambulance
Medic 3	1991 Wheeled Coach
Medic 4	1980 Ford-Road Rescue

Division of Emergency Services Statistics (circa 1991)

All firefighters were issues pagers as of 1991. In 1991 there were 93 commissioned law enforcement rangers on staff. 46 were permanent and 43 were seasonal. 553 arrests were made.

There were 26 major SAR incidents which resulted in 56 saves and 10 fatalities. There were 185 Medi-vacs by NPS helicopters and 5 by the Department of Public Safety Helicopter. 22 medical evacuations were conducted by mules.

The fire service responded to 10 structure fires, 32 trash fires, 12 false alarms, 1 car fire, 8 hazmat alarms, 8 EMS assists, and 100 wildfires (76 caused by human and 24 originated due to lightning with a total of 108 acres burned.

The Emergency Medical Service Responded to 1,145 Calls: 840 basic runs; 305 ALS Calls (170 medical / 88 Cardiac & 47 trauma); 14 fatalities.

Staffing: 16 first responders; 50 basic EMT's; 12 EMT-I; 5 Paramedic; 1 R.N.

Currently there are 207 permanent staff positions, which is a 45% increase over the last 12 years. NPS housing is provided for all. Medical Control has been transferred from the Flagstaff Medical Center to the Grand Canyon Health Center. There is a contract that pays out $195,000 per year for one medical doctor and two registered nurses to be on staff at the South Rim Clinic.

Mailbag:

Tony Goode submits the following: This is a listing of Ten-Codes, Signal Codes, Prefixes, and response codes for most agencies in and around Central Iowa.

The only exception is the Des Moines Police Dept. They stopped using the Ten-Codes several months ago, but some officers still do on occasion.

Central Iowa Ten-Codes

10-1 Unable to copy-bad signal
10-2 Signal is good
10-3 Stop transmitting
10-4 Acknowledgment
10-5 Relay
10-6 Busy-stand by(unless urgent)
10-7 Out of service
10-8 In service
10-9 Repeat
10-10 Fight in progress
10-11 Dog case
10-12 Stand by(stop)
10-13 Weather/road report
10-14 Prowler
10-15 Civil disturbance
10-16 Domestic dispute
10-17 Meet complainant/caller
10-18 Complete assignment
10-20 Location
10-21 Call by telephone
10-22 Disregard
10-23 Arrived at scene
10-24 Assignment completed
10-25 Report in person
10-26 Detaining subject
10-27 Driver license info.
10-28 Car registration info.
10-29 Check if wanted
10-30 Illegal use of radio
10-31 Crime in progress
10-32 Armed with weapon
10-33 Emergency
10-34 Riot
10-35 Major crime alert
10-36 Time
10-37 Suspicious person or vehicle
10-38 Stopping suspicious person or vehicle
10-39 Urgent-use lights & siren
10-40 Silent run-no lights/siren
10-41 Beginning tour of duty
10-42 Ending tour of duty
10-43 Info.
10-44 Permission to leave patrol
10-45 Animal carcass at_____
10-46 Disabled vehicle/assist motorist
10-47 Emergency road repair needed
10-48 Traffic standard needs repair
10-49 Traffic lights out
10-50 Traffic accident
PD-Property damage
PI-Personal injury
F-Fatality
10-51 Tow truck needed
10-52 Ambulance needed
10-53 Road blocked
10-54 Livestock on road
10-55 Intoxicated driver
10-56 Intoxicated pedestrian
10-57 Hit & run
10-58 Direct traffic
10-59 Convoy or escort
10-60 Squad in area
10-61 Personnel in area
10-62 Reply to message
10-63 Make written copy
10-64 Message for delivery
10-65 Next message
10-66 Message cancel
10-67 Clear on next message
10-68 Dispatch info.
10-69 Message received
10-70 Fire/fire alarm
10-71 Advise nature of...
10-72 Progress on fire
10-73 Smoke report
10-74 Negative
10-75 In contact with
10-76 En route
10-77 E.T.A.
10-78 Need assistance
10-79 Notify coroner
10-80 Chase in progress
10-81 Malicious mischief/vandalism
10-82 Reserve lodging
10-83 Incomplete 911 call/welfare check
10-84 If meeting—advise
10-85 Will be late
10-86 Landlord/tenant dispute
10-87 Pick up reports
10-88 Advise telephone #_____
10-89 Bomb threat
10-90 Alarm
10-91 Unnecessary use of radio
10-92 Illegal parking
10-93 Blockade
10-94 Drag racing
10-95 Wagon needed
10-96 Mental subject
10-97 B & E (breaking & entering)
10-98 Prison or jail break
10-99 Wanted or stolen
10-150 Disable repeater
10-200 Request backup
10-250 Request k-9 unit

Prefixes

A & B	Assault & battery
China	Child in need of assistance
Fuofi	Fraudulent use of financial instrument
GOA	Gone on arrival
PBX	Telephone
UTL	Unable to locate
OC	Owen Crist Towing
DMA	Des Moines Sutomotive (D.M.P.D. Impound lots)

Des Moines Fire Dept. Priority/response codes (as of 8/95)

1–Routine call/non emergency....No lights or siren...Obey all traffic laws.
2–Use lights/siren but still obey all traffic laws.
3–Urgent call...Lights/siren...Driver is allowed to speed with regard to traffic & weather conditions.

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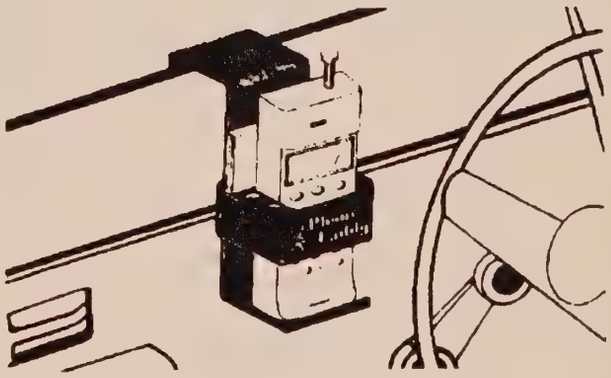

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More Mail

I received an anonymous letter on official stationary from the NYC Sheriff's Office detailing their radio programming scheme. In most localities the Sheriff is usually responsible for transporting prisoners, security of the county jail, security in court, and may provide local law enforcement. However, in New York City the Sheriff has a more limited capacity. The jail prisoners are in the custody of the New York City Department of Corrections, who employ their own Corrections Officers, while the courts are protected by New York State Court Officers. The Sheriff, in most cases, handles court-ordered evictions and also will seize and impound motor vehicles that have outstanding traffic violations. If the owners of the vehicle do not come down to pay the fines in a timely fashion the vehicle is then sold at auction and the proceeds go into the city's kitty.

N.Y.C. Sheriff's Office
Radio Frequencies

Motorola HT-1000 (Smaller Black Radios)-

Channel	Frequency	Use
1	481.0375	Point to point
2	470.8625	NYPD Citywide 3
3	470.8275	NYPD S.O.D.
4	470.7625	NYPD Detective 1
10	476.7375	Citywide 1 (Sheriff secondary)
11	476.6875	Citywide 2 (Sheriff primary ops)

Motorola HT-600 (Gray radios)

1	481.0375	Point to point
2	470.8625	Citywide 3
3	470.8375	S.O.D.
4	470.7625	Detective 1
5	476.7375	Citywide 1 (Sheriff Secondary)
6	476.6875	Citywide 2 (Sheriff Primary)

It is my belief that the Sheriff's Officers may be using the N.Y.C. D.G.S. 800 MHz trunked system as well. Sheriff's cars are also equipped with M.D.T.'s to run plate checks.

N.Y.P.D. Ramblings–Commissioner Bratton is out and has been replaced with the Fire Commissioner Howard Safir. The First Deputy Police Commissioner has resigned after being passed over for the promotion and the Fire Fighters union boss has been given the Fire Commissioners job. (Now he will be bargaining from the other side of the table.) Did you follow all that?

More mail from Pete Szerlag

Boston EMS–Ch. "Comm 16": 453.775
MA State Police–Simplex Operations Boston Area: 866.5125
Marshfield F.D. (Plymouth County): 33.920

Station 1-	HQ	Engine 1, Ladder 1, Amb 1
Station 2-	North Hills-	Engine 2
Station 3-	Brant Rock -	Engine 3

Pete reports that the Marshfield Fire Department is a fully-paid department. There are three engines on standby (Engines 4,5, & 6) and off-duty firefighters can be paged (33.72 Mhz) to operate these vehicles if the situation arises. He also states that Ambulances 1 & 2 are privately-owned and contracted out to the municipality.

Marshfield F.D. Radio Identifiers

"Mobiles"–Engines 1,2,3,4,5,6, Rescue 1, Ladder 1, Forest 1,2, & 3
"Intercoms"–located at the pump on engines 1,2,3,4,5,6 and on the ladder turntable
"Portables"–Eng 100,200,300,400,500,600, Rescue 100, Amb 100, Forest 100,200,300, Ladder 100, C-200 is Chief Officer

Pete Also gives the frequency of 464.9625 for the DistriGas Company. He states that Super-tankers unload at the waterfront and a pipeline leads to huge above-ground storage tanks. The Everitt Fire Department dispatcher has the capability to communicate on this frequency.

Corrections Department: Mike from New York Writes:
Hey Ed,
From your Public Safety Communications column in the July 1996 US Scanner News, from the list for Bedford, Westchester County:
NYS, Bedford Hills KNIX 606 460.100 R
This is the Taconic Correctional Facility under the NYS Dept. of Corrections.
Mike, RCMA NY-551

Thanks to Mike and all those who wrote in this month. Feel free to write in with any questions or comments to Ed Muro c/o the U.S.S.N. editorial offices (the address is listed on page three of the magazine) or by e-mail to : edmuro3@aol.com.

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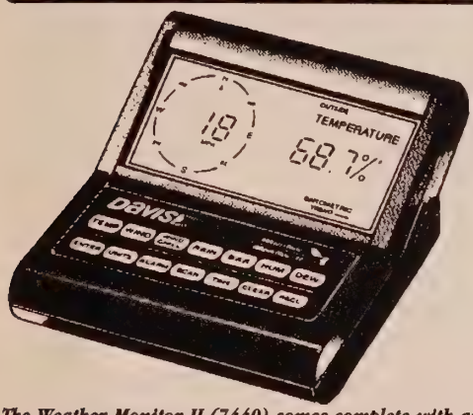

The Weather Monitor II (7440) comes complete with anemometer with 40 feet (12.2 m) of cable, external temperature sensor with 25 feet (7.6 m) of cable, junction box with 8 feet (2.4 m) of cable, AC-power adapter, detailed instruction booklet and one year limited factory warranty.

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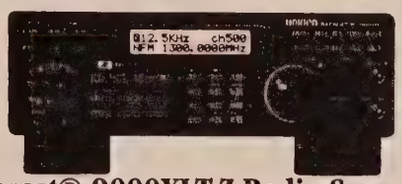
Thermometer with transparent calender & clock display by OSI **TC188-Z**	$19.95
Thermometer with AM/FM clock radio by Oregon Scientific **CR388-Z**	$39.95
Indoor/Outdoor Thermometer with Jumbo Display by OSI **JB880EX-Z**	$24.95



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The Bearcat 9000XLT is superb for intercepting communications transmissions with features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. **Hi-Cut filter** to help eliminate unwanted static noise. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty.

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THE OTHER SIDE

Strange Happenings Before The Olympics

Too Many Full Moons This Month; Roger Drills His First Hole In His New Truck; Portable Potty as a Trojan Horse.

by Janet Cravens

This month has been full of strange occurrences in and around Atlanta. At the time of this writing, it is less than two months before the 1996 Olympics begin. Lots of positions are open for security guards, transportation agents, bus and taxi drivers, interpreters, etc. This is also a wonderful time to test the rapid rail system we have in Atlanta, called MARTA. Several days ago a MARTA train derailed; this is only the second derailment in the 17 years of operation. There were no serious injuries and no fatalities; most have been released from the hospital. But as the news media digs and digs, trying to make a mountain out of a molehill, it was discovered that the train operator had an accident in a bus in 1994 and is still facing charges for vehicular homicide. Seems like MARTA appears to have the same philosophy that you see in most federal employees - you know the one, "screw up, move up". It is my belief that the higher a federal employee goes in rank, the dumber he/she must be to get the position.

The Olympic venues are located throughout Georgia, and several are located in Tennessee and South Carolina. Several towns have recently passed an ordinance denouncing homosexual lifestyles. Those towns have either become strongly entrenched in the belief that the gay lifestyle is wrong and will defend it until their dying day. Those towns have slowly but surely been obliterated from the Olympic venues and activities. When other towns which passed the same ordinances realized they would lose the revenue from the Olympics, they rescinded them faster than they became law in the first place. It's amazing how long people stand on their principles when they realize money is involved.

Even the animals around here have been acting strange. Two weeks ago, I heard a couple of police officers talking on the scanner about arresting a dog. This caught my attention, so I listened intently. The police officer on the scene could not determine if the animal was a dog or a wolf. The police were afraid to get closer to the animal in case it was indeed a wolf. They finally got close enough to the animal to see it wasn't carrying any identification, so they went ahead and arrested it for vagrancy. This troubles me somewhat. I can't figure out exactly what type of identification they would need.

In Stone Mountain, Georgia, on the northeast side of Atlanta, animals have been behaving strange as well. A person driving their car through an intersection saw a large moose standing by the side of the road, not far from the tennis venues for the summer Olympic Games. It was reported as unknown whether the large, obtrusive mammal was interfering with the OTHER 32 passengers aboard the bus or simply taking in the scenic view. I don't know about you guys, but it seems to me we may have had too many full moons this month.

Last month, I told you about the cow in the parking lot at the International House of Pancakes (IHOP). Several weeks ago, he came back, holding a placard which read "eat more chicken." Also this month, Animal Control was called out to pick up a bull who was going through the parking lot at Walmart's. Now, being the smart young woman I am, I would say that these animals are exercising their civil rights to shop, eat out, and have holiday excursions just like people. As a matter of fact, if you believe in evolution, these animals may just be a couple of steps away from evolving. I guess we really don't need to worry too much about it though, unless they start applying for credit cards. When I was younger, we used to hear the phrase "We're so poor our roaches have a Medicaid card around their neck." I guess if the truth were known, I'd just as soon not have animals using either card.

Several days ago, we had quite a stir here in the old neighborhood where Animal Control was called out to bury a cow. I'm telling you, the full moon must have lasted all month! We've had snakes, cows, pigs, goats, sheep, and dogs all over the place. Who would have imagined when they first bought their scanner that the radio would be used to listen to the intricacies of the animal kingdom and their life and death.

We also have Olympic skating bears in Atlanta for an event sometime in July. I'm just a little confused about this - exactly when did we start making skates large enough for bears to wear, let alone wondering how someone decided they needed the bears to skate and actually wanted to teach them how to skate. I can see it now, some little boy says to his mommy, "Mommy, someday when I grow up I want to train grizzly bears to skate on ice."

There have also been some strange people happenings. I don't remember if I told you last month about the teenage boy who called 911 and asked someone to come pick him up and take him to Atlanta to see his girlfriend. The dispatcher said the caller advised he'd

asked his guardian to take him to Atlanta, but she refused. Once 911 told him they wouldn't come out unless it was an emergency call, he threatened to kill himself with a knife. The police had no way of knowing the idiot was trying to use a butter knife. They ended up transferring him to the Georgia Mental Health Institute, located in ... That's right, downtown Atlanta. Of course, since he was downtown, he could see his girlfriend. People wonder about the sanity of teenagers today. I think we need to wonder about their parents, too.

It's also been a strange month, weatherwise, as well. We've had several severe thunderstorm warnings, but have not had a bad storm, at least where we live. The temperatures were in the 90's for about 11 days in a row and even the nights were miserably hot and muggy. The weather did seem to get to one young man, who was arrested for walking down the Interstate at 2:30 in the morning, naked. No clothes, no shoes, no socks, no nothing. The police weren't exactly sure if he was auditioning for Ray Stevens next "The Streak" song or if he was hot, or too drunk to know he wasn't wearing anything.

We also heard the 911 call for a security alarm which had been activated. As one cop was racing to the scene, another came on the radio to tell him he could slow down. It seems this 94-year-old woman lives by herself and her children had an alarm system installed. Unfortunately, the lady didn't exactly know how to use it, but she realized that if the alarm was activated, someone would come to see if she was okay. She offered them tea and cookies when they arrived. As one cop said to the other, "She just does that when she gets lonely." Roger thinks the police should just go by several times a week and have tea and cookies with her, then she wouldn't be obliged to set off the alarm all the time.

This has been a devastating month in the Cravens' household. I told you last month about Roger's little blue Dodge Ram 50 pickup giving up the ghost. It only had 212,000 miles on it. We thought we could get it to run for at least another six or eight months. We pulled up our bootstraps and purchased Roger a new Ford F150 - it only took two hours for him to disconnect all the radios and antennas from the old truck to put in the new one. Of course, I can't understand why he wants to drill a hole in a brand new pickup truck.

Actually, he managed to wait at least three weeks before drilling the first hole in his new truck. He now has an antenna on the back of his brand new pickup truck that is taller than the Leaning Tower of Pisa. I'm not certain he's even going to be able to go over most bridges and overpasses. We can really pick up those alien transmissions now from Hartsfield International Airport and the Charlie Brown Airport in Atlanta. Lucy and Snoopy can't stay for the Olympics, though. They're still trying to find Woodstock. (We actually have a town by this name north of Atlanta.)

The Dodge Ram 50 was relatively easy to fix, so we gave the truck to our son, David. The truck had no get up and go, but wherever you wanted to go, it eventually "went." Two weeks after getting his driver's license, David wrecked the Dodge and is back on foot again. He had a wreck in my sister's car when he still had his learner's permit and totalled her van. Less than six months later, he totalled out the truck. I decided to let him walk a while before we talk about another car any time soon, but his dad (my ex-husband) decided otherwise. His new truck is so difficult to explain in English terminology; Roger just calls it a "pimp truck." They bought it at the Sheriff's Auction Sale when they were selling all the vehicles that had been confiscated during drug busts and other criminal activity.

All things considered, though, Roger's little truck was a good one. You should have seen it when he had all his radios and antennas in and on it, respectively. There was no room for him to have a passenger travel in the truck with him, and the bed of the pickup was atrocious. Roger tells me sometimes he's the most boring man on the planet. There must have been two trash bags full of coca cola cans, Camel cigarette packages and large cups from McDonalds. I don't think an undercover detective could find anything suspicious in that—unless they thought he was advertising for McDonalds as they pursued alien beings.

Speaking of aliens, the Immigration and Naturalization Service (INS) has been cracking down on illegal aliens living and working here in Atlanta. In one raid, the INS arrested 17 illegal aliens who had crossed the U.S. border in a portable potty. Now I don't know about you, but those things are usually so small you have to step outside to change your mind. I cannot imagine how they could cram 17 people in one, or how the INS figured out they were in there.

Another raid by the INS occurred several weeks ago. Thirty-four illegal aliens were arrested living in a horse trailer with filth and dirt and feces all around. An additional 43 were picked up from Fort McPherson, a military installation located in southwest Atlanta, where they were involved in construction and building projects. They quickly cleaned them out now, but as each employee goes through the gates each morning, they have to sing a stanza of God Bless America, show them their Social Security card and provide a Xeroxed copy of their last leave and earning statement.

I guess that gives me room for pause. We Americans do not appreciate the wonderful life that God has provided for us, the freedom our forefathers fought to achieve or the advantage of receiving an education where we can all do better than our parents. We need to spend a few minutes of each day thanking God we are not living in a horse trailer, aren't crammed into a portable potty, and that we have a good clean place to lay our head at night. We need to thank God for those men and women who fight each day or are prepared to fight so that we can be free.

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TRANSPORTATION

North Carolina

Industry and Tobacco Lead the States Exports

by Roger West

North Carolina occupies a median location along the Atlantic seaboard and is bounded by South Carolina and Georgia on the South, on the West by Tennessee, on the North by Virginia, and on the East by the Atlantic Ocean. The Capital of North Carolina is Raleigh, located in the East-Central part of the state. North Carolinians are called Tar Heels, a nickname the origin of which is still debated. The other nickname of the state is Old North State. With its involvement in both the Revolutionary and Civil Wars, North Carolina has a rich historical tradition on which, in part, a growing tourist industry is based. Traditionally agricultural, with many tobacco plantations, the state was one of the first in the South to industrialize and now ranks high in industrial output.

North Carolina is divided into three main physical provinces: the Coastal Plane, the Piedmont, and the mountains. The eastern boundary of the Coastal Plain is a chain of barrier islands, the Outer Banks, separated from the mainland by lagoons and salt marshes. The miles of beaches are geologically ephemeral and ecologically vulnerable. The Coastal Plain is divided into the Tidewater area, which is quite flat, poorly drained and often marshy, and the inter Coastal Plain, which is higher, better drained, and better suited for agriculture.

The Coastal Plain merges with the gently rolling Piedmont at the Fall Line, where the change in slope makes navigation more difficult and waterpower a possibility. Raleigh, like many important East Coast cities, lies near the Fall Line. The Piedmont elevations range from 295 to 591 feet in the East to 1,500 feet at the Blue Ridge. The Piedmont encompasses about 45% of the area of the state, about the same percentage of the total area as the Coastal Plain.

The Blue Ridge Mountains, which is the beginning of the mountain province, rise above the Piedmont. In the Tar Heel State, the Appalachian chain reaches its zenith. More than 40 peaks are higher than 6,000 feet, and Mount Mitchell, at approximately 6,700 feet, is the highest peak East of the Mississippi. The rounded contours of these very old mountains testify to long periods of erosion.

The Old North State's soils are complex and varied but generally low in plant nutrients and minerals, which have been washed away by hard summer rains. Sandy soils dominate in the Coastal Plain, red clay in the Piedmont, and thin residual soils in the mountains. Heavy applications of line and fertilizers are necessary for good yields, and continued care must be taken to prevent erosion.

Although the state has no major river, the area is drained by a dense network of streams in three distinct systems. The first of these rises west of the Blue Ridge, drains into the Gulf of Mexico through the Tennessee and Ohio Rivers and includes the French Broad and Little Tennessee Rivers. The second system drains the Piedmont south and east through South Carolina and Georgia and includes the Catawba and Yadkin Rivers. The third network, which includes the Cape Fear, Neuse, Roanoke, and Tar Rivers, drains the Piedmont by way of the Coastal Plain into Abermarle and Pamlico Sounds. Only the Cape Fear River flows directly into the Atlantic Ocean. The state has no large natural lakes and few sizable artificial reservoirs.

North Carolina ranks high among U.S. states in farm production, number of farms, and farm income. Tobacco is the dominant component of the state's agriculture, along with other leading farm commodities, such as broilers, hogs, and turkeys. Principal crops grown in the state include sweet potatoes, peanuts, corn, grapes, pecans, apples, tomatoes, and soybeans. North Carolina's major agricultural counties are located on the Coastal Plain or among Northern Piedmont counties on the Virginia border. Cotton is grown in scattered areas along the South Carolina border. Although farm employment continues to decline, a significant share of the state's jobs are still connected either directly or indirectly to agriculture.

A small fishing industry is based on the Atlantic Coast, and the forest products industry provide raw materials for the furniture and pulp industries. There are about 300 varieties of rock and minerals found in North Carolina, of which many have commercial value. The state is a leader in the production of feldspar, lithium, mica, and phosphate rock, and most of North Carolina's energy comes from outside sources.

There are several major ports in North Carolina. Wilmington and Morehead City are the major ports, and are connected by the Atlantic Intercoastal Waterway. North Carolina was the first Southern state to build an extensive network of farm-to-market roads and is now well served by highways, which include five interstates. Today, trucks are more important than

railroads in moving goods. The state is also served by numerous airports.

The city of Raleigh which is located in the east-central part of North Carolina is the capital of the state as well as the county seat for Wake County. The city's industries manufacture food products, pharmaceutical, textiles, and electrical components. Raleigh is part of the Research Triangle Park complex, devoted to cultural, scientific, and educational research. Notable historical buildings include the Greek Revival-style capitol and U.S. president Andrew Johnson's birthplace, now a historic shrine. Raleigh is the seat of the North Carolina State University, Shaw University, and several other colleges. The North Carolina Museum of Art is also located in Raleigh.

Cape Hatteras, which is a promontory on Hatteras Island, is the easternmost point of North Carolina's Outer Banks, a chain of low, narrow islands that buffer the mainland from the Atlantic. Frequent storms off Cape Hatteras have taken a heavy toll on shipping through the centuries. Known as the Graveyard of the Atlantic, Cape Hatteras has had a lighthouse since 1798. The current one is 208 feet tall. It is the tallest lighthouse in the United States and has been in operation since the late 1800's. The Cape Hatteras National Seashore, which can be monitored on 162.400, 164.725 and 169.650, is composed of 70 miles of unspoiled beaches, dunes, and salt marshes, and comprises the islands of Bodie, Hatteras, and Ocracoke. There are visitor centers and special tours for children during the summer.

New Barn, which is located in eastern North Carolina at the confluence of the Neuse and Trent Rivers, is the county seat of Craven County. The City of New Barn rivers flow toward the Intracoastal Waterway and make New Bern an important port and trading center for the surrounding agricultural and resort area.

The city of Greensboro is located in the Piedmont region in north-central North Carolina and is the county seat of Guilford County. Greensboro is the third largest city in North Carolina and is a diversified industrial city and an insurance and distribution center. Its many educational institutions include the University of North Carolina, North Carolina Agricultural and Technical State University. It is also home to Greensboro College.

Wilmington is the principal seaport of the Tar Heel State, and the seat of New Hanover County. The cities economy is based on shipping and rail transportation, tourism, and manufacture of textiles, boilers, fertilizer, and wood products.

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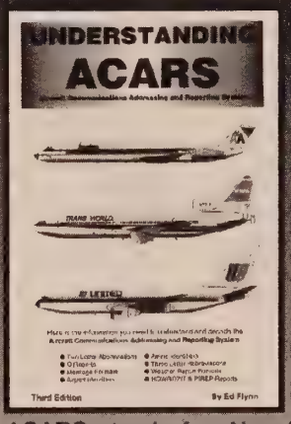

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(ALL TIMES SHOWN ARE UNIVERSAL STANDARD TIME)

PITT-GREENVILLE AIRPORT, GREENVILLE

REMARKS- Attended 1030 to 0430.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** 24 hour helicopter operations at hospital which is located 1.5 nautical miles South-Southwest of airport; and the helicopters monitor the Pitt-Greenville CTAF on 122.800!!
** Parachute jumping/sky diving in vicinity of airport!!

AWOS-3 (weather)	128.425	
CTAF/UNICOM	122.800	
Appr/Dep	135.500	272.750

CHERRY POINT MARINE CORPS AIR STATION

(CUNNINGHAM FIELD, JUST NORTH OF HAVELOCK)

(2nd MARINE CORPS AIR WING; BOGUE AUXILIARY LANDING FIELD)
MAIN AIRFIELD OPERATIONS:
REMARKS- Attended continuously.
PILOT ALERTS!! ** Extensive student jet training in vicinity of air station!!
** Flocks of birds on and in vicinity of air station, mainly from October-April!!
** Parachute jumping/sky diving in vicinity of air station!!

SFA/PTD		306.600
ATIS		354.900
Appr	124.100	268.700
	119.350	374.900
Tower	121.300	263.600
Ground	128.625	380.800
Dep	132.575	278.800
Clearance	125.950	263.600
Metro (weather)	344.600	
Camel Base	383.400	
26th Ops Marine Air Group	33.85	281.200
Bonnie Sue Control		262.600
National guard helicopters		359.700
Restricted Area 5306A Range control		317.100
Target Control		299.600
		314.800
		320.400
		337.200

GROUND OPERATIONS:

Maintenance	138.060	
Fire Dept/Crash Crews/Tks	140.100	
	149.100	
Security	139.960	
	140.350	
Survival Training	45.70	
Commanders Net	138.625	

BOGUE MARINE CORPS AUXILIARY LANDING FIELD OPERATIONS:

REMARKS- Operations 1400 to 2400 Monday-Thursday, 1400 to 1700 Fridays except for holidays, and 1600 to 0200 Monday-Thursday, and 1300 to 1600 Friday except for holidays except when daylight saving time is in effect.
PILOT ALERTS!! ** Parachute jumping/sky diving in vicinity of auxiliary landing field!!

Appr/Dep	124.100	268.700

(All aircraft using this auxiliary field must make contact 268.700)

Tower	119.500	321.800
Ground		262.600
Clearance		262.600
METRO (weather)		344.600

BOGUE MARINE CORPS AUXILIARY LANDING FIELD GROUND OPERATIONS:

Base Operations	48.70

NEW RIVER MARINE CORPS AIR STATION (MC CUTCHEON FIELD),

APPROXIMATELY 2 MILES NORTH OF JACKSONVILLE
(MARINE AIR GROUP 26 AND 29; Mc CUTCHEON FIELD)
REMARKS- Operations 1200 to 0400 Monday-Friday, 1400 to 0200 Saturdays, and 2000 to 2400 Sundays.

ATIS (not monitored 24 hours a day!)		265.200
Appr (contact for Instrument Flight Rules clearance into New River area!)		
	119.350	374.900
Tower	41.95fm (emergencies)	360.200
		340.200
Ground	121.800	352.400
Dep	119.350	362.200
New River Operations		236.400
METRO (weather)		250.600
GROUND OPERATIONS:		
Crash Crews	140.010	
Fire Department	141.950	
	141.975	
Security	140.300	

WARREN FIELD, WASHINGTON

REMARKS- Attended 1300-2300.
PILOT ALERTS!! ** Tall trees on and in vicinity of airfield!!
** Power lines and poles on and in vicinity of airfield!!
** Deer on and in vicinity of airfield!!

CTAF/UNICOM	122.700	
Appr/Dep	135.500	272.750

RALEIGH EAST AIRPORT, KNIGHTDALE

REMARKS- Attended 1330-Dusk, and unattended Thanksgiving and Christmas Day!!
PILOT ALERTS!! ** Tall trees in vicinity of airport approximately 8' tall trees first 1000' of Runway 01, 30' to the left, and approximately 25' tall trees 95 east of Runway!!

CTAF/UNICOM	122.800

ELIZABETH CITY COAST GUARD AIR STATION AND MUNI. AIRPORT, ELIZABETH CITY

REMARKS- Attended 1200 to 0300.
PILOT ALERTS!! ** Periodic tethered balloon operations 3 nautical miles Southeast of airport during daylight hours at 3,000'!!
** The coast guard complex has numerous building within the building restriction lines!!
** Noise abatement area.....STRICT PROCEDURES ARE REQUIRED....avoid overflight of populated area Northwest of airfield below 1500'!!
** Blimp operations and training site 3 nautical miles Southeast of field, and operations take place in surrounding area!!
** Seasonal low-flying agricultural aircraft based in the local area!!

CTAF	120.500	
FSS	122.050	
	122.200	
Appr/Dep	123.850	
Tower	120.500	
Ground	121.900	
Coast guard general operations		171.2375
	171.3625	
Coast guard air operations		381.800
		381.700
		383.900
Distress	156.800	
	157.100	
Search and rescue oper.	123.100	282.800
	156.300	

MARTIN COUNTY AIRPORT, WILLIAMSTON

REMARKS- Attended November to May 1400 to 2200, April to October 1300 to 2300.
PILOT ALERTS!! ** Deer on and in vicinity of airport!!

CTAF/UNICOM	122.800
Appr/Dep	135.500

ELIZABETHTOWN AIRPORT, ELIZABETHTOWN

REMARKS- Attended 1300 to Dusk.
PILOT ALERTS!!** Tall trees in vicinity of airport, and also obscure the airport beacon!!
** Deer on and in vicinity of airport!!
** Flocks of birds on and in vicinity of airport, mainly in the Spring and Fall!!
** Low level military activity in the vicinity of the airport!!

CTAF	122.800
Appr/Dep	133.000

FIRST FLIGHT AIRPORT, KILL DEVIL HILLS

REMARKS- Unattended, and is closed 30 minutes after Sunset until 30 minutes before Sunrise.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Hang gliding to 4,000' in vicinity of airport from Sunrise to Sunset year round!!
** Powered hang gliding to 4,000' in vicinity of airport from Sunrise to Sunset year round!!
** Unmarked power lines and poles in approach area of Runway 02!!
** 300' tower and tank located 1/2 mile North of Runway 20!!

CTAF	122.900

KINGSTON REGIONAL JETPORT AT STALLING FIELD, KINGSTON

REMARKS- Attended 1100 to 0430.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Flocks of birds on and in vicinity of airport, mainly during daylight hours!!

CTAF	120.600	
UNICOM	122.950	
FSS	122.100	
Appr/Dep	127.300	338.600
Tower (1130-0300)	120.600	338.000
Ground	121.900	

CRAVEN COUNTY REGIONAL AIRPORT, NEW BERN

REMARKS- Attended 1030 to 0430.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF	123.650	
FSS	122.200	255.400
	122.400	
	123.650	
	122.100	
Appr/Dep	132.300	294.700
	118.100	318.100

BILLY MITCHELL AIRPORT, HATTERAS

REMARKS- Unattended and closed 30 minutes after Sunset until 30 minutes before Sunrise.
PILOT ALERTS!! ** Power lines and poles on and in vicinity of airport!!
** High speed-low level military operations in vicinity of airport!!
** Airport is within Cape Hatteras National Seashore - maintain 2000' vertical and horizontal distance from seashore beaches!!
RESTRICTIONS!! ** No night operations!!

ASOS (weather)	118.375
CTAF	122.900
FSS	122.300
Appr/Dep	135.500

ALBERT J.ELLIS AIRPORT, JACKSONVILLE

REMARKS- Attended 1000 to 0100.
PILOT ALERTS!! ** Deer on and in vicinity of airport!!
** Flocks of birds on and in vicinity of airport!!

AWOS-3 (weather)	124.475
CTAF/UNICOM	123.000
Appr/Dep	121.400
	135.500

SKY MANOR AIRPORT, JACKSONVILLE

REMARKS!! ** Unattended.
PILOT ALERTS!! ** Deer in vicinity of airport!!

CTAF/UNICOM	122.800

CURRITUCK COUNTY AIRPORT, CURRITUCK

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Power lines and poles on and in vicinity of airport!!
** Flocks of birds on and in vicinity of airport!!
** Deer on and in vicinity of airport!!
** Hang gliding activities on and in vicinity of airport from Sunrise to Sunset!!

CTAF	122.900

NORTHEASTERN REGIONAL AIRPORT, EDENTON

REMARKS- Attended 1300 to 2200.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Seasonable problem with flocks of birds and deer on and in vicinity of airport!!

CTAF	122.800
Appr/Dep	123.850

HYDE COUNTY AIRPORT, ENGELHARD

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Restricted area R5313 is located 5 miles east of airport!!
** Restricted area R5314 is located 5 miles north of airport!!
** Both restricted areas have a high concentrations of military aircraft within 1000' above ground level and in excess of 500 knots!!
** All aircraft landing and taking off from Hyde County Airport should remain over land east of airport!!
** Unlighted and unmarked 40' power lines and poles along east side of U.S.Highway 264!!

CTAF	122.700

TRIPLE W AIRPORT, RALEIGH

REMARKS- Attended 1300 to Dusk.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Tower 500' above ground level and 826' MSL located approximately 1.75 nautical miles Northwest of airport!!
** Be alert for rising terrain in all quadrants!!

CTAF	122.700

CRAFT AIR AIRPORT, FARMVILLE

REMARKS- Attended Monday to Saturday 1330 to 2300.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute jumping/skydiving in vicinity of airport!!
** Unmarked power lines and poles located 100' from Runway 18!!
** 1169' lighted tower located 3 miles south approach end of Runway 36!!
** 6' high corn located within 50 feet of runway edges and south of runway in Summertime!!

CTAF	122.900

FLANAGAN FIELD, FARMVILLE

REMARKS- Attended on call.
PILOT ALERTS!! ** Glider operations in vicinity of airport!!
** Ultralight aircraft in vicinity of airport!!
** Aerial banner towing in vicinity of airport!!
** Aerial crop spraying in vicinity of airport!!
** Parachute jumping/Skydiving in vicinity of airport!!

CTAF	122.900

DARE COUNTY REGIONAL AIRPORT, MANTEO

REMARKS- Attended 1300 to 0000.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Banner towing operations 200' West of Runway 04!!
** Migratory bird problems!!

AWOS-3 (weather)	128.275	
CTAF/UNICOM	122.800	
Appr/Dep	123.850	323.000
General operations	155.745	

HELIFAX COUNTY AIRPORT, ROANOKE RAPIDS

REMARKS- Attended 1200 to Dusk.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute jumping/skydiving in vicinity of airport!!

CTAF/UNICOM	122.800
Appr/Dep	118.750

OCRACOKE ISLAND AIRPORT, OCRACOKE

REMARKS- Unattended, and closed 30 minutes after Sunset until 30 minutes before Sunrise!!
RESTRICTIONS!! ** Night takeoffs prohibited!!
PILOT ALERTS!! ** Flocks of seagulls on and near runway around standing water after heavy rains!!
** High speed low level military operations in vicinity of airport!!
** 20' sand dune 300' Northeast runway!!
** Be advised that airport is within Cape Hatteras National Seashore - maintain 2000' vertical and horizontal distance from seashore beaches!!

CTAF	122.900
Appr/Dep	135.500

FLYING W AIRPORT, PINK HILL

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
RESTRICTIONS!! ** Visual Flight Rules (VFR) only!!

PINK HILL AIRPORT, PINK HILL

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Airport is under several military low level routes - jet traffic cross airport under 500' in excess of 200 knots!!

CTAF/UNICOM	122.700

PLYMOUTH MUNI.AIRPORT, PLYMOUTH

REMARKS- Attended Monday to Friday 1400 to 2200.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Deer activity in vicinity of airport!!
** Airport is located 4.3 nautical miles West of military restricted area.....there is a safety problem due to fast military aircraft crossing airport below 3,000' MSL enroute to restricted area, and the crossing are unannounced - USE EXTREME CAUTION!!

CTAF/UNICOM	122.800
Appr/Dep	135.500

RALEIGH-DURHAM INTERNATIONAL AIRPORT, RALEIGH

REMARKS- Attended continuously.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Flocks of birds on and in vicinity of airport!!

UNICOM	122.950	
ATIS	123.800	
FSS	122.200	255.400
	122.450	
	122.650	
Appr	125.300	388.000
	132.350	256.900
	128.300	307.900
	124.950	392.100
Dep	125.300	388.300
	132.350	256.900
Tower	119.300	257.800
	127.450	
Ground	121.900	348.600
	121.700	
Clearance	120.100	
Ntl guard oper.(49.15FM)	126.100	242.400

TRI-COUNTY AIRPORT, AHOSKIE

REMARKS- Attended Monday to Saturday 1300 to Dusk, Sundays 1800 to Dusk.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF/UNICOM	122.800	
Appr/Dep	123.850	323.000

NEW HANOVER INTERNATIONAL AIRPORT, WILMINGTON

REMARKS- Attended continuously.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF	119.900	
SFA/UNICOM	122.950	
ATIS	121.100	
FSS	122.100	
Appr/Dep	135.500	272.750
	118.250	276.300
	135.750	343.900
	121.400	
Tower (1100-0500)	119.900	239.300
Ground/Clearance	121.900	348.600

SEYMOUR-JOHNSON AIR FORCE BASE, GOLDSBORO

(4th WING/FEDERAL PRISON)
AIRFIELD OPERATIONS:
REMARKS- Attended continuously.
PILOT ALERTS!! ** Uncontrolled vehicle traffic on taxiway and apron!!
** All inbound aircraft with VIP's contact consolidated command post on 381.300 (RAYMOND 25) when 60 nautical miles out!!

SFA/PTD	372.200	
ATIS	273.500	
Appr	119.700	338.600
	123.700	320.100
Dep	123.700	320.100
	119.700	338.600
Tower	126.250	255.600
Ground	275.800	
Clearance		363.800
Command post		381.300 (RAYMOND 25)
ACC Supervisor of Flying		280.500
METRO (weather)		375.200
Restricted Rnge Area 5314		349.100 (Dare County)
		358.880 (Dare County)

GROUND OPERATIONS:

Security	148.175
	148.545
	163.4875
	164.500
Medics	173.5625
Disaster operations	150.315
Crew Alerts	413.450
Fire Dept/Crash Crews/Tks	173.5875
Prison operations	170.650
	170.875
	170.925
	170.900
	409.250
	413.6625

OCEAN ISLE AIRPORT, OCEAN ISLE BEACH

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Trees along parallel taxiway are within close proximity of taxiing aircraft!!

CTAF	122.900

BRUNSWICK COUNTY AIRPORT, SOUTHPORT

REMARKS- Attended 1200 to 0000 October to April, 1100 to 0100 May to September.
PILOT ALERTS!! ** Deer on and in vicinity of airport!!
** Flocks of birds on and in vicinity of airport!!

CTAF/UNICOM	123.000
Appr/Dep	118.250
	135.500

WILSON INDUSTRIAL AIR CENTER, WILSON

REMARKS- Attended 1300 to 2300.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF/UNICOM	123.000
Appr/Dep	135.300

ROCKY MOUNT-WILSON AIRPORT, ROCKY MOUNT

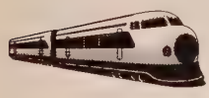
REMARKS- Attended Monday-Friday 1100 to 0300, Saturdays and Sundays
1200 to 0300.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute jumping/skydiving in vicinity of airport!!

CTAF/UNICOM	122.950	
FSS	122.200	255.400
	123.600	
Appr/Dep	135.300	285.500
Clearance	123.600	

GOLDSBORO-WAYNE MUNI.AIRPORT, GOLDSBORO

REMARKS- Attended 1300 to Dusk except Christmas, News Years, and Thanksgiving!!

CTAF/UNICOM	122.700	
Appr/Dep	123.700	320.100



By Land

TAXI SERVICE AT RALEIGH

Area Taxi	152.270
Area Taxi	157.530
Strop Taxicab	152.270
Rainbow Cab	152.330
Blue Diamond Cab	152.360
Acme Cab	152.390
Airport Express	452.0875/457.0875
Airport Express	452.200/457.200

TRUCKS AT RALEIGH

Roadway Express	159.660
Waste Industries	159.690
W.E. MANGUM ENT	452.475/457.475

CSX TRANSPORTATION RAILROAD AT RALEIGH

?	160.215
Road	160.590
Road	161.100
PBX	161.265
Police	161.040

CAROLINA AND NORTHWESTERN RAILWAY AT RALEIGH

Road	160.950

AMTRAK RAILROAD THROUGH NORTH CAROLINA

Road	160.230
Road	160.590
Road	161.370
Road	161.100
Dispatcher	160.320
Dispatcher	161.520

CSX TRANSPORTATION INC RAILROAD, AT ROCKY MOUNT

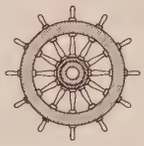
?	160.395
?	160.785
?	161.490
Yard	161.100
Yard	160.290
Car Department	160.440
Car Department	161.460
Road	160.590
Road	161.550
PBX	161.265

CSX TRANSPORTATION INC RAILROAD AT GOLDSBORO

Yard	160.290
Road	160.590
Road	161.100
Road	161.370
Maintenance of Way	160.785
?	160.055
PBX	161.415
Dispatch	161.520

NORFOLK SOUTHERN RAILWAY AT GOLDSBORO

Dispatcher	160.245
Road	160.950



By Sea

MARINE FREQUENCIES AT SOUTHPORT

Carolina Per & Light Co.	156.425	Comm/Rec/Air
Carolina Pwr & Light Co.y	156.450	Comm/Rec
Seafood Source	156.425	Comm/Rec/Air
Seafood Source	156.450	Comm/Rec
Seafood Source	156.500	Comm
Southport Fish Market	156.425	Comm/Rec/Air
Southport Fish Market	156.450	Comm/Rec
Southport Fish Market	156.550	Comm
Southport Marina	156.425	Comm/Rec/Air
Southport Marina	156.450	Comm/Rec
State of North Carolina	156.450	Comm/Rec
State of North Carolina	156.675	Port Operations
State of North Carolina	156.900	Comm/Air
Redbone Inc	156.450	Comm/Rec
Redbone Inc	156.475	Comm/Rec
Cape Fear Marine	156.600	Coast Guard/Civilian
Cape Fear Marine	156.900	Comm/Air
All companies	156.800	Calling/Emergency

AT CEDAR ISLAND

State of North Carolina	156.450	Comm/Rec
State of North Carolina	156.675	Port Operations
State of North Carolina	156.900	Comm/Air
State of North Carolina	156.800	Calling/Emergency

AT NAGS HEAD

Oregon Inlet Fishing Center		156.425
Comm/Rec/Air		
Nags Head Watersport	156.550	Comm
All	156.800	Calling/Emergency

AT CAROLINA BEACH

Coqunia Hrbt Carolina Bch	156.450	Comm/Air
Coqunia Hbr Carolina Bch	156.800	Calling/Emergency

AT MOREHEAD CITY

Anser Quik Comm. Inc	156.425	Comm/Rec/Air
Anser Quik Comm. Inc	156.450	Comm/Rec
Coral Bay Marina	156.425	Comm/Rec/Air
Dockside Marina	156.425	Comm/Rec/Air
Dockside Marina	156.450	Comm/Rec
Fetzer Associates	156.425	Comm/Rec/Air
Portside Marina	156.425	Comm/Rec/Air
Morehead City Export Term	156.450	Comm/Rec
Morehead City Export Term	156.500	Comm
Morehead City Towing	156.450	Comm/Rec
Morehead City Towing	156.700	Port Operations
Morehead Sports Marina	156.450	Comm/Rec
Texasgulf	156.450	Comm/Rec
Texasgulf	156.725	Port Oper.
State of North Carolina	156.675	Port Operations
Lucky International	157.025	Comm/Rec
North Carolina Port Auth.	160.320	
All	156.800	Calling/Emergency

AT WRIGHTSVILLE BEACH

Wrightsville Beach Seafood	156.350	Comm
Wrightsville Beach Seafood	156.450	Comm/Rec
Benson Marine Group	156.425	Comm/Rec/Air
Benson Marine Group	156.450	Comm/Rec
Seapath Marina	156.450	Comm/Rec
Carolina Yacht Club	156.925	Comm/Rec
All	156.800	Calling/Emergency

AT MANTEO

Salty Dawg Marina	156.475	Comm/Rec
Salty Dawg Marina	156.975	Comm/Rec
Salty Dawg Marina	156.800	Calling/Emergency

T BUXTON

Scott Boatyard	156.425	Comm/Rec/Air
Scott Boatyard	156.450	Comm/Rec
Scott Boatyard	156.500	Comm
Scott Boatyard	156.800	Calling/Emergency

Air Mail

I received a letter from Earl Wilbur of Wellston, Ohio, thanking me for the frequencies which he had requested for his area. You are welcome, Earl! I will be watching for the list of frequencies that you are going to send me, letting me know which of the frequencies that you are able to monitor!

I also received a letter from N. Mister (no first name) of Atlantic City N.J., who sent me the following frequencies:

New Jersey Tran Trns	160.830 Police	Safe Sound Security	461.950
	160.400 Road	Ham Radio	146.985
Sand Casino	463.500		146.820
Bally's Casino	464.100		146.520
	464.125 F-2		462.615
Showboat	461.625		461.900
Trump Plaza	461.512	Birch Communications	461.100
	461.812	S.J. Gas	153.650
Trop World	464.725	A.C. Electric	47.98
Claridge	464.350	Public Works	154.100
Harrah	463.425	Civil Defense	158.775
Trump Castle	463.200	Ocean One Mall	461.900

Thanks, N.!

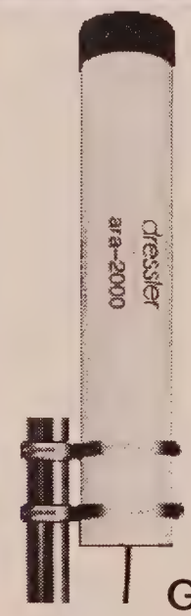
I would like to hear from other readers as to what you are monitoring in your part of the country. If there are some frequencies that you are looking for, drop me a line and I will try to find them for you! 73's, Roger

Credits:

DoD Publications — Airport/Facility Directory
My data file — FCC Data File
Mr. Earl Wilbur of Wellston, Ohio — N. Mister of Atlantic City, N.J.

USSN

NEW VHF/UHF ACTIVE ANTENNA!



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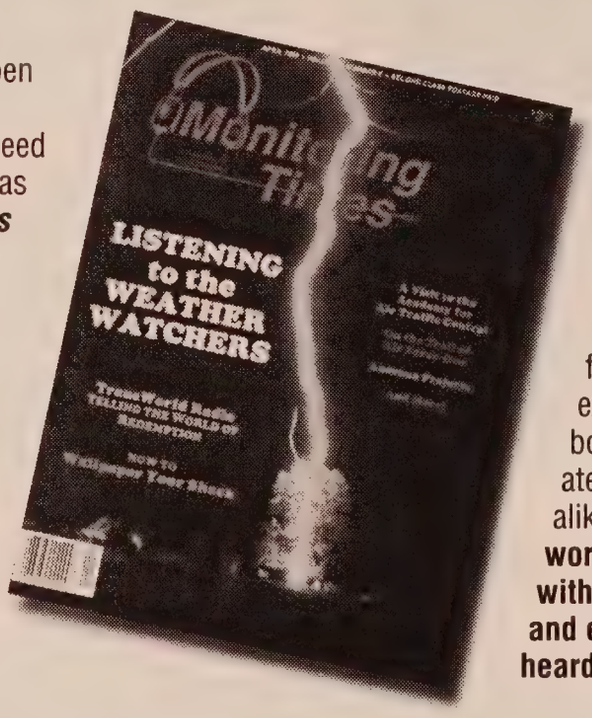

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SPACE COMMUNICATIONS

Good Antennas Are Important

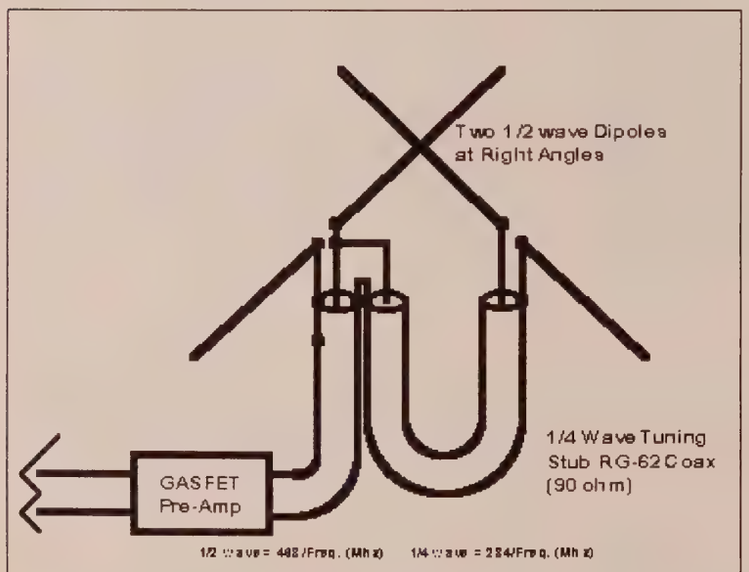
A Discussion of Antennas and Feedlines.

by Donald E. Dickerson, N9CUE

Good quality antennas are an important piece of equipment in any aspect of the communications hobby. This is particularly true if you are interested in DX, or tuning in distant stations. This is no less true when trying to catch the rarest DX of all, those electronic emanations from places other than earth. And if you want quality pictures from weather satellites you are going to have to do all you can to increase the signal from the satellite. The antennas is where we will start.

There are two separate weather satellite systems you have access to. One is a geo-stationary satellite system with satellites 22,000 miles above the equator in the Clarke belt, the same place all the TV satellites are located. The other is a series of Low Earth Orbit (LEO) satellites. They maintain an altitude of approximately 560 miles. Each system has it's own special antenna requirements.

The current US fleet of LEO weather satellites consists of NOAA 9 and 11 which transmit on a frequency of 137.620 MHz and NOAA 10 and 12 which transmit on 137.500 MHz.



Twist Antenna

These spacecraft transmit images of earth in what is called Automatic Picture Transmission mode, or APT. The antenna used in the transmission of APT is circularly polarized. Instead of using a single vertical or horizontal radiating element, the antenna uses two. They are electronically phased 90 degrees apart, or 1/4 wavelength. The elements are at a right angle to each other. The phasing harness (a coaxial cable matching system) delays by 90 degrees the signal transmission from the second element. This causes it to twist the polarity into a circular pattern. The polarity can be twisted to the right or left as desired. The NOAA spacecraft use Right Hand Circular Polarization (RHCP). The Russians also have a LEO wxsat system that uses RHCP for APT transmissions. China is the only exception. It uses LHCP for its low orbit weather satellites. The Russian satellites are known as Meteor and transmit on 137.850 MHz and 137.400 MHz currently.

Weather satellites in LEO are only in range of your station for 8 to 12 minutes during an orbit. Each satellite will make at least two passes over your location during a 24 hour period. If you want to produce quality pictures (or perhaps I should say, depending on the quality of the pictures you want to produce), you will want an outside antenna and a pre-amp to boost the signal strength. The antennas with RHCP or LHCP are also known as twist or helical antennas. The best plans for such an antenna are found in Ralph Taggart's book called the Weather Satellite Handbook. Figure 1 will give you the basic dimensions for the antenna. You can make one yourself. Try anyone of several methods. You can use 300 ohm twin lead to form your twist antenna and lay it across the ceiling joists of your attic. The same 300 ohm twin lead can be used to make an antenna like Ron Burkes's (KB9DJA) shown below. He placed the antenna elements inside PVC pipe to protect it from the weather.

While the twist antennas are the best, some of you may want to experiment with your discone antenna if you already own one. A discone is an excellent antenna for reception of non-video space signals. A discone with a good pre-amp can give you 5 to 8 minutes of decent APT per pass. The discone is also a favorite of the military, both US and Russian. Air Force Communication Security intercept vans use 4 discone antennas for wideband operation (see photo).

For a professional quality antenna for weather satellite reception, I recommend the Vanguard APT-1, It also has ground radials that work as a reflector.

The next item we must talk about is coax cable. Here I would use nothing but Belden 9913. It is a low loss coax, 1.4 db at 100 feet, with 50 ohms impedance. There is no need to go to the trouble to put up a special antenna, install a pre-amp

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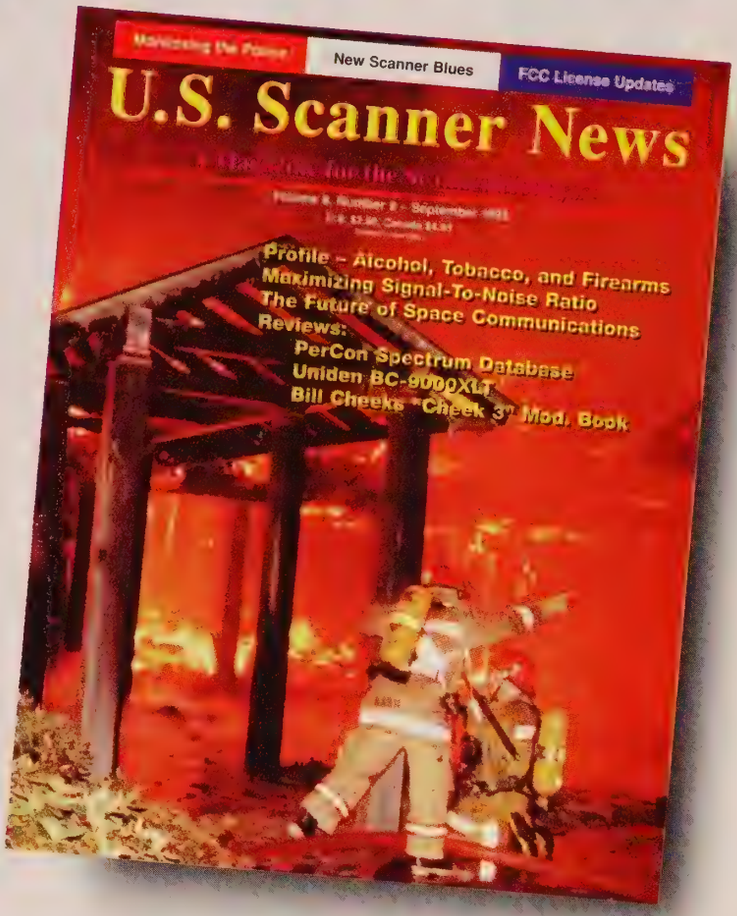

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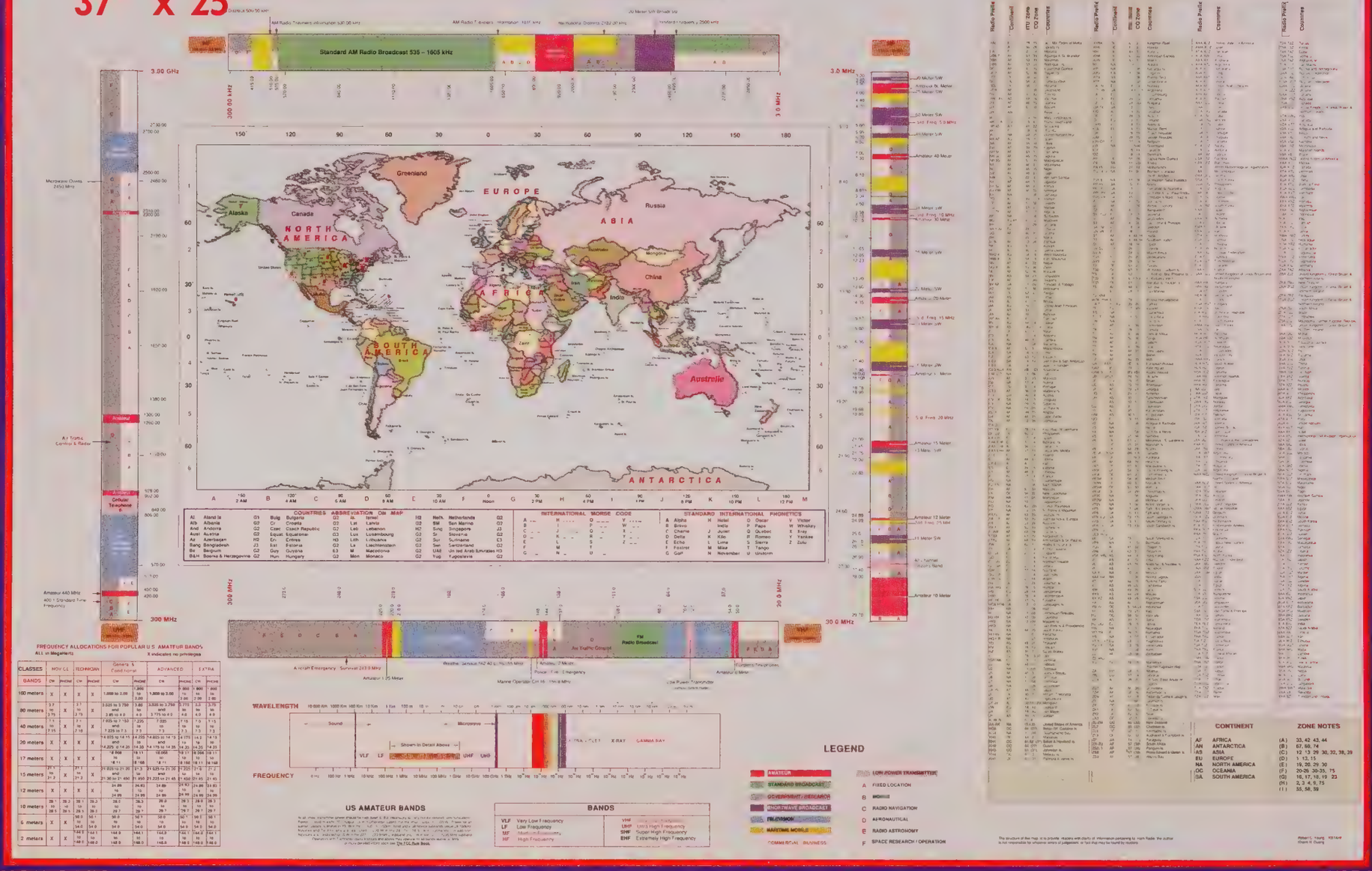

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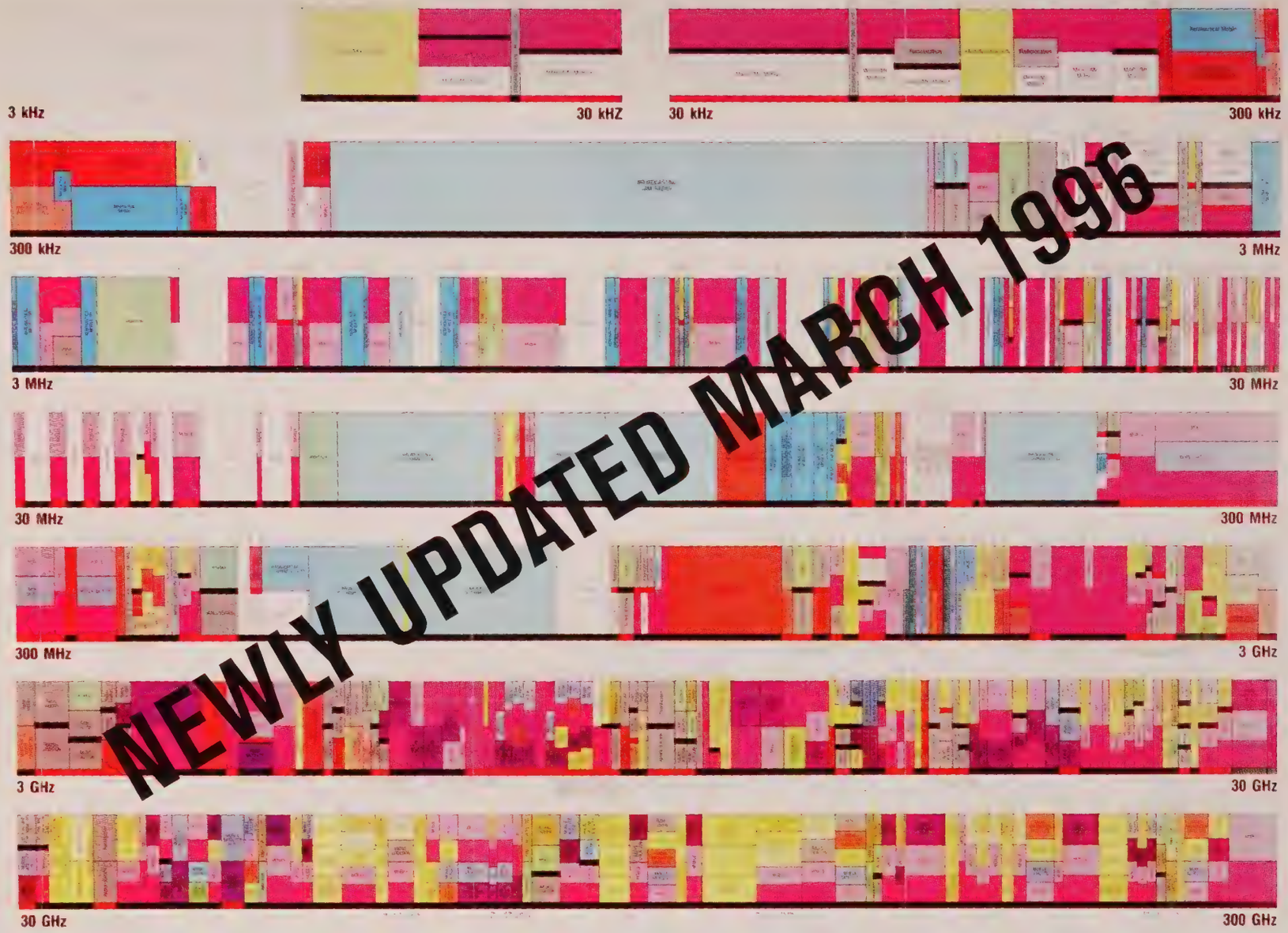

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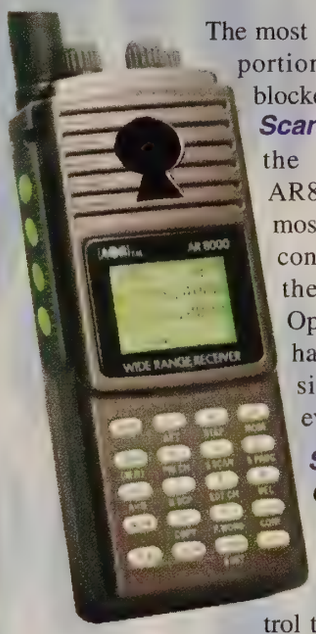

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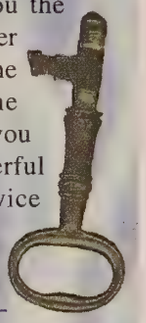

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and buy an expensive computer and software to display weather maps to simply have the signal leak out of the coax before it hits the receiver. Buy good coax! Use good quality connectors and don't use special adapters from one type connector to another unless absolutely necessary. You can loose as much as 3 db per connector that way.

Next you will need a pre-amp there are several manufacturers who make them for the 137 MHz band. These can cost anywhere from $60.00 up. Vanguard has a complete line of pre-amps, down-converters, antennas, receivers and complete systems.

You want to mount your pre-amp close to the antenna. This is usually accomplished by strapping it to the mast just below the antenna mounting bracket. This will boost the signal strength before it has incurred any loss by being feed into the coax.

It is at this point that a warning is called for. Many pre-amps these days are powered through the coax line. In other words, the 12 volts DC required to run the pre-amp is applied to the coax cable's shield and center conductor. This method is also used in TVRO systems, so pay attention. Whenever you want to pull an RF signal off a coax that also carries DC you must use a throughtap or DC block filter. Vanguard receivers already have this coupling circuit built into them. All others will need to have one attached in order to protect the receivers front-end from the DC voltage. Figure 2 will show you how to build a through-tap.

It is usually most convenient to apply the DC voltage to the pre-amp in the shack at the coax cable just before it is fed into the receiver antenna jack.

Well, that just about takes care of this month's look at Wxsat. Next month we will look at antenna systems for the geo-stationary weather satellites. After that we still have the modem, computer and software to look at.

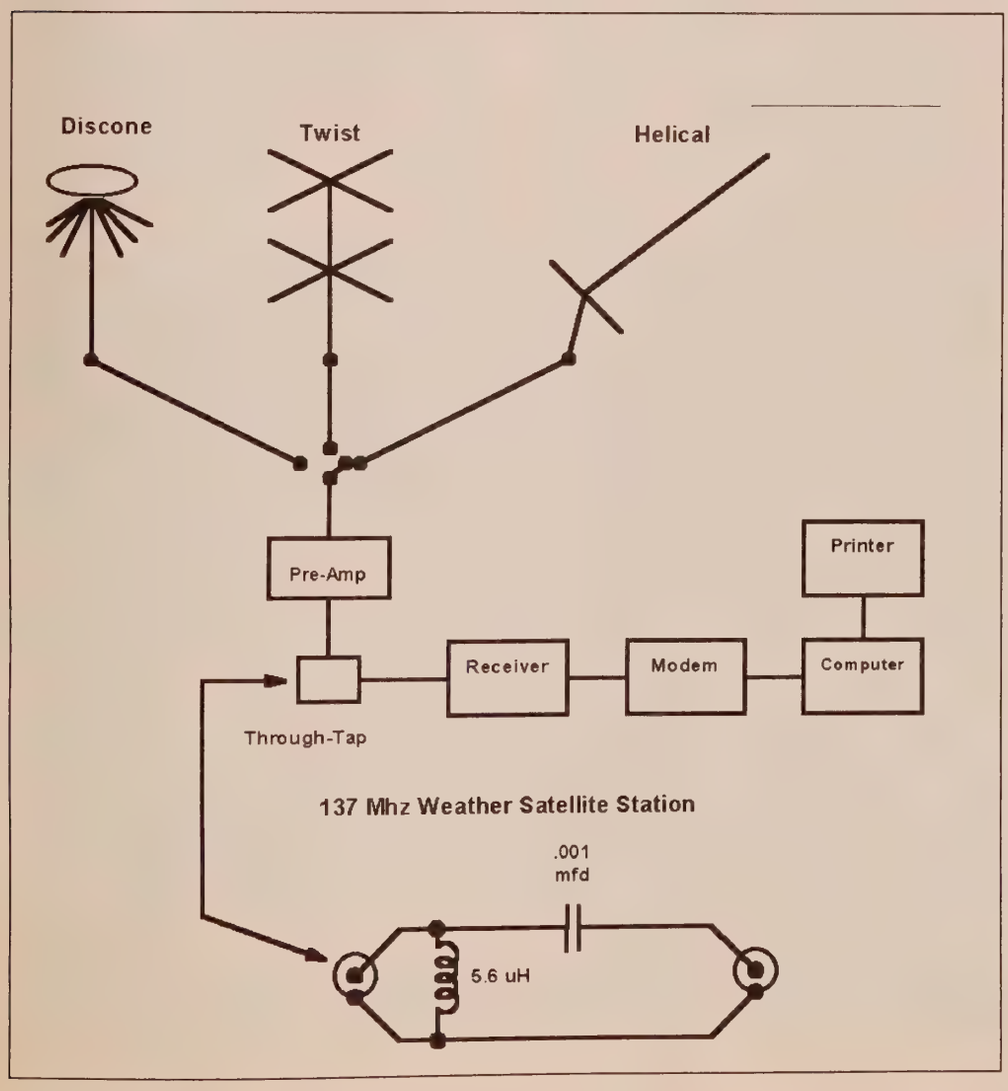
USSN

Lindenbald, Quadrifilar and Helix

These somewhat less than everyday names are names of very specialized antennas, In this case they are used, or can be at least, as weather satellite antennas for receiving APT. The Lindenbald is a harnessed set of four dipoles, 30 degrees apart, each is tilted 30 degrees. This omni-directional antenna performs well in the horizontal plane and favors low angle vertical-polarized signals.

The Quadrifilar is an antenna that looks a great deal like an egg beater. It might best be described as a complex twist antenna with two pairs of feed points, 90 degrees out of phase. The Helix is a circularly polarized antenna that looks like a cork screw.

Each of these antennas can be adapted for use in the 137 MHz satellite band. For a detailed look at each of these antennas, an explanation of how they work and instructions on how to build these sky hooks, you will need a copy of Martin Davidoff's book, The Satellite Experimenter's Handbook, published by the ARRL,



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INTERNET

Wild Weather On The WWW

Storm Chasers Use The Internet And So Can You.

by Steve Baker

Eighty percent of all hurricanes occur in the months of August and September. I live on the Gulf Coast and the threat of another devastating hurricane keeps me watching the weather when it gets this late in the summer. The last time a big hurricane made it's way near Galveston there was not much of a choice when it came to weather information.

There was a time that everyone talked about the weather but no one knew much about it. That's changed. Now there are weather-dedicated cable channels (the Weather Channel: www.weather.com) that broadcast round-the-clock tornadoes of information. There are newspapers that feature informative columns by weather experts and the Internet is helping to educate the weather hungry public.

People are interested in the weather. It is hard to predict weather, and that gives it the air of uncertainty that people love. Films such as "Twister" and dramatic videos about weather from National Geographic and others are fueling the fire of public interest.

By now many of you have seen the movie "Twister." If you haven't, I am sure that you have heard about it. It is a story about a group of storm chasers who wish to decipher the complicated weather phenomena known as a tornado.

They want to understand how a tornado forms and what goes on inside it. Once they have that data, they hope to enhance the prediction time. Right now, it is tough to give more than a few minutes warning — often there is no real warning. If people could be notified of a tornado with a few more minutes, lives could be saved. That much of the movie was accurate.

The rest of the movie featured violent tornadoes of epic proportions that caused things to occur that were simply impossible — a flying 18 wheeler, an orbiting cow, and the use of laptop computers to identify the intensity of tornadoes in real time.

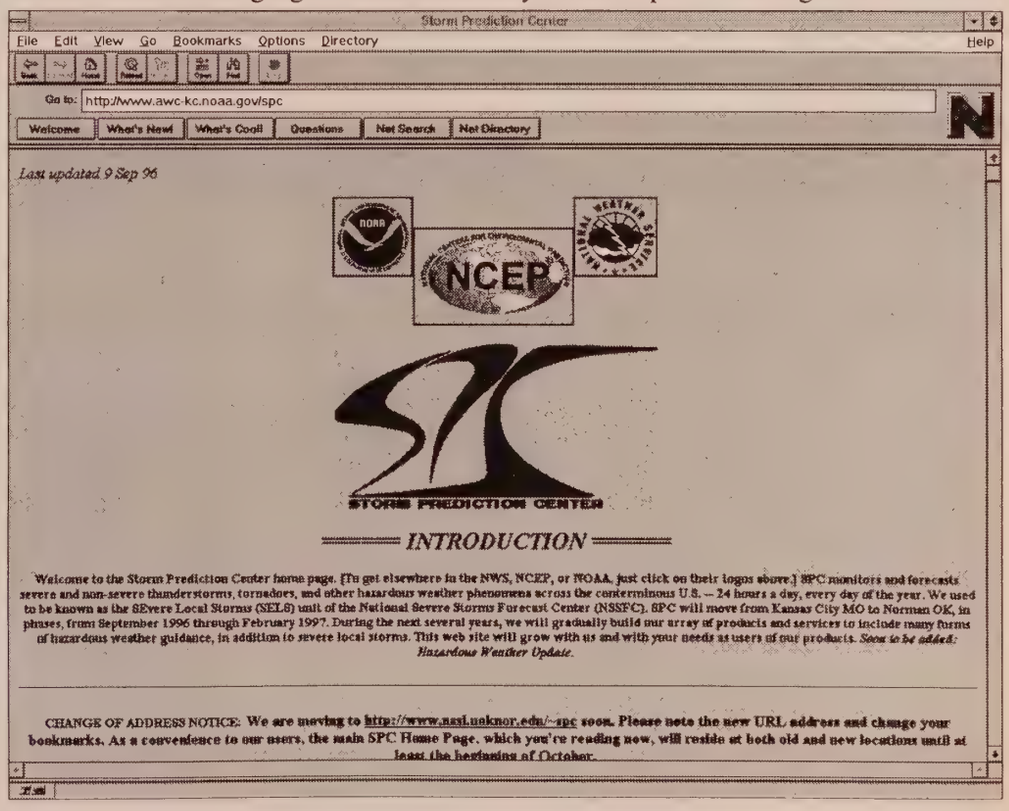
Since I watched the movie I researched storm chasing on the Internet and learned that experts measure the intensity of a tornado based on the amount of damage that has been done, not with a real time doppler radar and a satellite uplink with your mobile laptop. I also learned that things get sucked INTO a tornado, not orbited around it.

Storm chasers are real, and they do use the Internet to help them understand the weather. So can you.

If you are interested in keeping track of the changing weather that affects you, there are several options. You can watch television and tune in to local broadcasts and cable TV channels such as The Weather Channel, you can turn on your scanner and tune to the National Weather Service weather information network and you can connect to the Internet.

The Internet? Yes, the Internet. Once online, not only can you find forecast information for every part of the country, you can also access a wealth of graphical radar maps to help you visualize what is going on above and around you.

This month we will take a look at resources that can be found on the World Wide Web that can help you become a better informed, more knowledgeable person about the weather. Keep in mind that you should not use your computer during a bad storm



National Center For Enviornmental Protection Web Site.

because your equipment might become damaged by lightning-induced power surges.

To access the information we will discuss this month you will need a computer (IBM compatible or Macintosh), a modem (9600 baud or better) and a subscription to America Online, Compuserve, Prodigy, Delphi or an Internet Service Provider. If you need more information on setting up an Internet-ready computer or how to sign up with any of these services, write to me in care of this magazine or via the Internet at ACCESS@PHOENIX.NET. I answer all letters and email and welcome your comments, questions and suggestions.

First stop, the National Weather Service Aviation and Storm Prediction Center Point your browser to this site by typing:

http://www.awc-kc.noaa.gov/spc

The Storm Prediction Center monitors and forecasts severe and non severe thunderstorms, tornadoes and other hazardous weather across the United States. They monitor the weather and issue bulletins and reports, twenty-four hours a day, seven days a week.

By accessing this site you can find statistics about all types of severe storms (hurricanes, tornadoes, winter weather and severe thunderstorms), historical data, downloadable forecasting tools, technical forecasting reference materials and aviation forecasts.

Next, The Interactive Weather Information Network.

http://iwin.nws.noaa.gov/iwin/main.html

This site features state and national data, severe storm warnings from all over the nation, world weather, weather graphics and links to other weather sites.

It also provides access to all available weather warnings for the United States from the National Weather Service. You can also access information about EMWIN, the Emergency Managers Weather Information Network.

Weather bulletins are sometimes a little hard to understand. Put them together with a good radar graphic and your understanding of what the weather is doing gets better. Point your browsers at:

STORMWATCH

for a sample of these graphics:

http://www.earthwatch.com/severe.html

STORMWATCH converts National Weather Service bulletins (watches and warnings) from all parts of the country into graphical displays. The main screen features a map of the United States that is color coded to designate the type of severe storm being displayed. The map is clickable, and allows you to zoom in on the area that you live.

Mark Hubers Weather Site takes the concept of graphical information about the weather and runs with it. He features links to live doppler radar images supplied by a number of television stations from across the country.

Doppler radar is a method of determining the direction and speed of wind and rain. This data can be obtained by taking into consideration the frequency and delay of the reflected radar signals.

This site also features NEXRAD doppler radar images, along with upper air, surface and satellite models and forecast images. There is also a variety of links to other web pages concerned with weather and a few links to storm chaser web pages.

USA Today (www.usatoday.com) features one of the most comprehensive weather databases on the entire Internet. This site contains long and short range weather and UV-radiation forecasts for the entire country. You can access weather, climate, temperature and precipitation data (current and historic), along with a number of educational articles and graphics.

All of the sites in this article contains links to other world wide web pages containing weather information. By clicking on these sites, you can research and explore information about all types of weather related material using the Internet.

One of the most effective methods of dealing with severe weather is to be prepared for it. Information from the Internet can help you become a better informed, weather savvy storm watcher.

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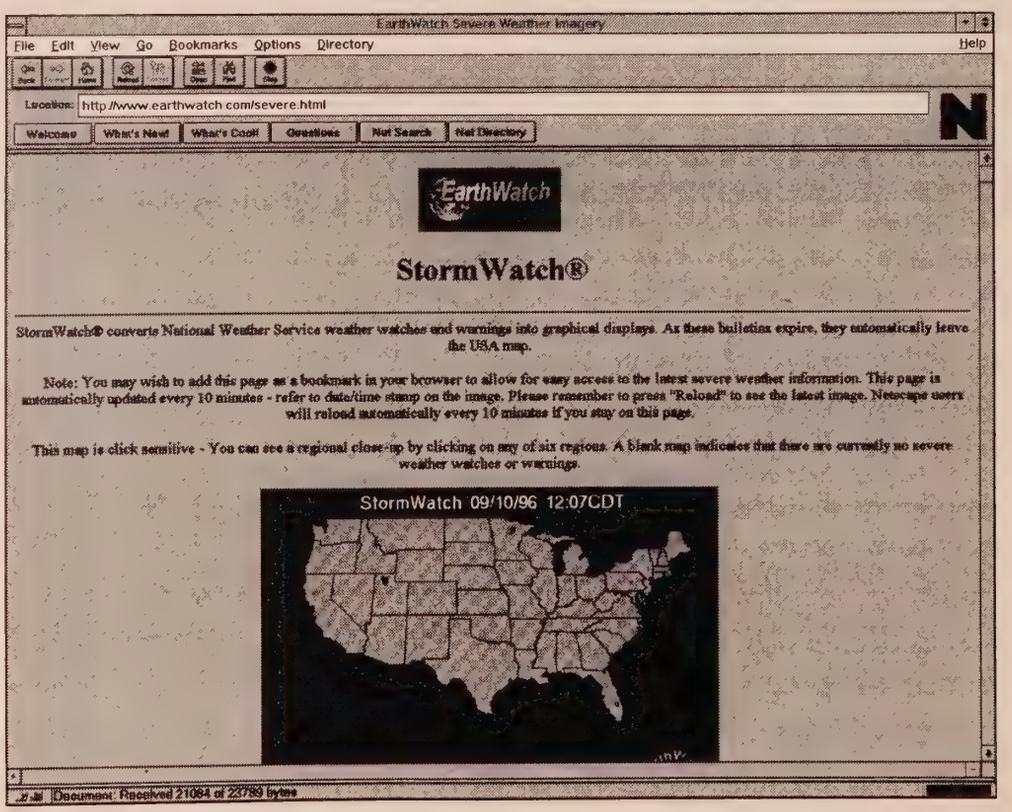

STORMWATCH Web Site

BEGINNERS

Tracking Distant Signals

Hints And Tips On How To Hear The Weak Ones.

by Laura Quarantiello

The transmissions were weak, scratchy and, more often than not, lost behind the other voices on the frequency. I'd been listening to 33.70 MHz for two days now and still had failed to hear any information that would help me to identify the station. It had become a minor obsession over the past couple of hours to positively identify the distant fire department dispatches.

Unfortunately, given the changing nature of the atmosphere, it was likely that when I woke up the next morning and turned on the scanner, 33.70 MHz would be silent and the transmissions gone. To understand how a long distance transmission can appear and disappear like that, we'll have to do a quick study of radio wave propagation - the near magic of what happens to a radio wave once it heads off into the atmosphere.

When a radio signal or wave leaves the antenna of a transmitter, it becomes, in theory, two distinct parts: a ground wave that travels along the surface of the Earth, and a sky wave that travels out into the atmosphere. The ground wave travels a short distance before it becomes absorbed by the Earth, but the sky wave is much more resilient and that's the wave distant-transmission listeners tune in to.

The sky wave travels on its merry way, high up into the wild blue yonder, until it encounters the ionosphere. That layer of our planet's atmosphere, some 150 to 200 miles high, is constantly under bombardment by the Sun, which charges the ionized gases therein. When a sky wave hits that layer of charged gas, it is partially reflected. Some of the wave that is not reflected is absorbed and the remainder flies off into deep space, fodder for whoever might be out there listening on distant planets. The portion that is successfully reflected returns to Earth at an angle, which means that it comes down many thousands of miles from its point of origin. That phenomenon is known as "skip."

Skip is almost a mystical thing, affected by sunspots, ether and even the time of year. It can also be a scanner listener's best friend, if you know how to take advantage of it.

You don't need a control room full of radios in order to receive VHF skip transmissions. In fact, any scanner that will search the range of 30 to 50 MHz (and that's most scanners) will do nicely. Having a search feature is important, because you will definitely want to program in small ranges of frequencies and let the scanner do the work.

An outdoor antenna is not mandatory but it will improve your chances of hearing transmissions tenfold. A good all-band antenna like a ground plane or discone does fine, but a beam antenna can have definite advantages if you are searching for transmissions from a specific direction. Since the prevailing atmospheric conditions have the most to do with reception, whatever you use should pull in some signals, so give it a try.

Frequency guides are a great resource if you are serious about identifying the stations you hear. For example, a complete set of POLICE CALL PLUS frequency directories are invaluable for tracking down domestic Public Safety stations. For military stations, try a federal frequency directory such as TOP SECRET REGISTRY OF US GOVERNMENT FREQUENCIES. A good map book covering the United States is also handy.

Frequencies on the low band - from 30 to 50 MHz - are most affected by skip because of their long wavelengths. Frequencies in the higher VHF bands are not rejected by the ionosphere as well and tend to skip less. I don't consider 50 MHz the absolute top of the possible skip range. Many listeners can tell you that occasional forays above 50 MHz have netted some interesting audio catches, but for the best results, the pros go low.

Searching through the basement of the VHF band, your chances improve drastically. On a good day, it isn't unusual to hear communications from thousands of miles away, sometimes even from Canada, or Central America and other overseas locations. The key to hearing all this is knowing when and where to listen.

Since skip is affected primarily by the actions of the sun, it almost goes without saying that daytime is the best time for listening. Try between 9 AM and 7 PM or whenever your local dusk occurs. If you're shortwave-equipped, listen at 18 minutes past each other for propagation reports from WWV on 2.5, 5. 10, 15 or 20 MHz. The solar flux number given reflects the amount of ionization of the ionosphere's F2 layer and so the possibility of picking up long-distance transmissions rises with this number.

I like to target specific frequencies,

which I check regularly for communications. For instance, 38.90 MHz is a popular military range control frequency that I have programmed into my regular scan bank. If I hear communications on this channel, I know that skip is present and I set up search ranges to see what other frequencies might be affected and active.

Try programming in the range from 30 to 31 MHz and set your scanner to search between these two values. This is about as low as typical scanner will receive and is an excellent place to start. Here you will come across business communications, forestry reports, power and water utilities, and some public safety and military transmissions. If you find active distant signals here, work progressively higher. On some days on a small swath of frequencies will be affected, and on others you won't know where to tune first because of all the activity.

The region between 31 and 33 MHz is a super place to look for military communications, as are the 38 to 39 MHz and 40 to 42 MHz areas. Fire departments can be found primarily between 33 to 34 and 37 to 38 MHz. Highway patrol, a good target for beginners, can be found operating between 42 and 43 MHz. Take a look at the back of any POLICE CALL PLUS issue for their Consolidated Frequency List, which will guide you further.

Don't be afraid to experiment and seek ranges beyond the norm for skip. I frequency scan from 49.00 to 49.70 MHz, just below the cordless telephone/baby monitor band, which yields such catches as military range communications (like MCB Camp Pendleton, California at 49.00 MHz) and tactical operations (such as Army Explosives Ordinance Disposal on 49.70 and 49.80 MHz.) You never know what you'll find: I occasionally even hear live horse race announcements on 41.725 MHz.

During the Gulf War, scanner monitors reported heavy communications activity all across the low band from American and foreign troops in Saudi Arabia. Voices from Central America, Panama, Honduras, and the Dominican Republic are regularly heard engaged in US military operations. Furthermore, lots of counter-drug missions take place on low band, as well as a large amount of fire communications. Fish and Wildlife officers, whose activities often take them far from normal radio range, can often be heard talking on frequencies between 31 and 32 MHz.

The first order of business when you come across an active frequency is to take down some of the information you hear coming across the speaker. Call signs, place names, and unit ID's are all helpful. More than once I've tracked down a frequency user by tracing city names through a map book.

Here's an example: say 42.12 MHz is active with a dispatcher calling herself "San Diego." Looking up San Diego in a map book will reveal that it's a California location. Drag out the appropriate volume of the FREQUENCY ALMANAC or any other good frequency book, check all the licenses under 42.12 and you'll find a listing for the California Highway Patrol San Diego Office.

Military stations are more difficult if call signs such as "Alpha Six Echo" are used, but if you listen long enough you might hear the base name or a unit number. When that happens, check a federal frequency book for active stations on the frequency to get you closer to a positive ID.

Searching for distant signals - what pros call DX'ing - can be an engrossing, exciting, frustrating and highly variable hobby.

As I predicted, the 33.70 MHz signal I mentioned did fade away by the time I listening again the next morning. It was three weeks before I finally heard the signal strong enough to warrant some serious listening. With a little more attention I had my catch in no time: Jefferson Township Fire Department, Ohio, a distance of 2712 miles from my location.

If local communications are getting too routine and you'd like to explore how other services across the country handle their communications, go low and give low-band skip monitoring a try. **USSN**

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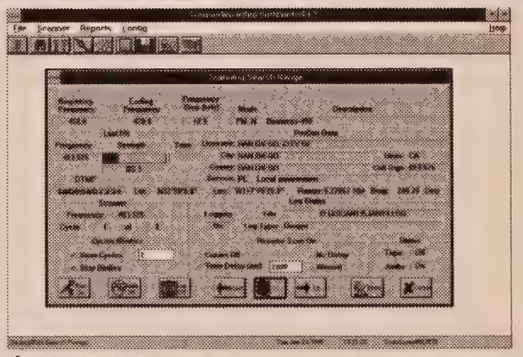

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PRODUCT ANNOUNCEMENTS

Optoelectronics Xplorer Test Receiver

Optoelectronics is excited to announce a new breakthrough communications product, the Xplorer Test Receiver. The Xplorer test receiver is a multi-purpose nearfield communications test and surveillance sweeper that sweeps the entire FM communications band from 30 to 2000 MHz in less than one second while tuning in nearby transmitters. It automatically stops on any active frequency, demodulates the audio, and displays the frequency of the transmitted signal. At the same time, the Xplorer will decode and display sub-audible signaling tones including DCS, CTCSS and DTMF, as well as display FM deviation and relative signal strength. The Xplorer can also be operated in VFO mode for manual tuning to a specific frequency.

The serial data interface on the Xplorer provides for TTL and RS-232C format. An NMEA-0183 interface is provided for GPS (Global Positioning System) latitude, longitude and altitude information. Up to 500 data records can be stored in memory and include Frequency, Time, Date, DCS, CTCSS, DTMF, Latitude and Longitude, as well as record up to 1000 hits per frequency.

Additional features include a battery backed-up, real-time clock, tape recorder control with DTMF output for data, and rapid charge for internal NiCad batteries.

Features Include:

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–Locks on to two way FM transmissions up to 1/4 mile away
–NMEA-0183 GPS interface permits tagging data with location for mapping applications
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–Includes high capacity NiCad batteries, power supply, antenna, PC interface cable, download software and earphone.

The price of the Xplorer is $899.
To order call Factory Direct
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Icom IC-R8500 Communications Receiver

Icom America has announced the imminent release of their new model IC-R8500 communications receiver. The R8500 is truly "DC to Daylight," with coverage from 100 kHz to 2000 MHz. In addition, the receiver/scanner also features all-mode capability (AM, FM, WFM, SSB and CW) on most frequencies and 1000 scan memory channels.

The R8500 was not released at press time and the folks at Icom knew little more than what is in their brochure. The scanner will feature memory channels arranged in twenty banks of forty channels each. (An extra 100 channels, each, are reserved for lockout and search-store.) And it appears that the R8500 will allow you to scan any combination of banks, one or all. Gone are the "select code" groupings of the R7100, which only allowed you to scan one or two "banks" at a time.

The brochure also states that the number of channels in each bank is user assignable, but it isn't clear if they mean the regular scan banks or what. And Icom didn't know.

A number of the other "mistakes" of the R7100 seem to have been cleared up in the new R8500. The RF attenuator is now a two-button affair - 10 or 20 db - instead of the single 20 db attenuator that cut out everything in the R7100.

And they actually appear to have the scan delay dilemma straightend out. The scan-resume delay is now adjustable, from zero to infinite if you wish. The only problem is that from all indications the setting is "global" - for all channels. The scan speed is also adjustable. The R8500 scans at "up to 40 channels per second," not lightning fast compared with most modern scanners but a vast improvement over its

predecessor model. A Sleep Timer allows one-button access to an automatic shut-off feature, a refinement over the almost useless, and extremely hard to use, on-off timer function on the R7100.

The R8500 also features ten sets of search limits, scanning by mode (AM, FM, etc.) if desired, and auto-store of frequencies found during search into 100 of the available channels.

One neat new feature is the alpha-numeric display. User names, for example, can be assigned to each channel in a bank, plus each bank can be labeled ("Police," "Fire," etc.).

And, wonder of wonders, Icom has decided to add an RS-232 interface to the R8500. There is still a jack for their proprietary CI-V interface, but no longer will the purchaser have to spring for an external adapter to interface with his or her computer.

But (and this is a big "but") the R8500 operates on DC power only! It has no power transformer. To run it at home, you have to shell out more bucks for their AD-55 AC adapter. (The price was not available yet.) So it appears that what they give you with one hand (an RS-232 interface), they take away with the other!

All indications are that the R8500 should also be a fine shortwave receiver, for those interested. It features an adjustable IF Shift control and an Audio Peak Filter, both of which are invaluable in the crowded HF bands. An optional 500 Hz Narrow CW filter is available, as is a High Stability Crystal Oscillator Unit. Two optional external speakers are available, but an Icom spokesman assures us that the audio quality of the R8500's internal speaker has been greatly improved.

All in all, this should be one heck of a receiver. It's price is projected to be the the $2000 range (plus the AC adapter).

Icom America.
2380 116th Ave. NE,
Bellevue, Wa. 98004. **USSN**

AIRSHOW UPDATE

The USAF Thunderbirds At Redmond, Oregon.

by USSN Staff

We didn't get a chance to take in the Blue Angels yet this year but we did see the T-Birds in August. A posting in one of the Usenet groups on the Internet gave a new Thunderbird frequency of 138.75, supposedly replacing 141.85, one of their two, long-time VHF frequencies. We found 141.85 still in use, along with the usual opposing flight frequency of 322.95 MHz.

The show we attended turned out to be one of the most interesting we've seen. A lightning-caused fire the previous evening had spread out of control by Saturday morning, causing the southern sky to go dark, literally! The fire, dubbed the Skeleton Fire, was thirty miles to the south of Redmond, OR, but still forced the Thunderbirds to do their "low-altitude" show. Complicating matters further was the fact that the airport where the airshow was held is the home of one of the U.S. Forest Service's aerial tanker bases! Every ten minutes or so, the Thunderbirds performance would be interrupted by a flight of four or five contract tankers going out or coming back in. The T-Birds would fly off into the distance and orbit, then re-converge at the field and resume their show.

This is highly unusual for a demonstration team, since they usually demand total control of an airfield during their performance for safety reasons. The crowd at Redmond didn't seem too upset by the interruptions, though. In fact, they cheered the tankers each time they landed. It was an interesting day, for sure.

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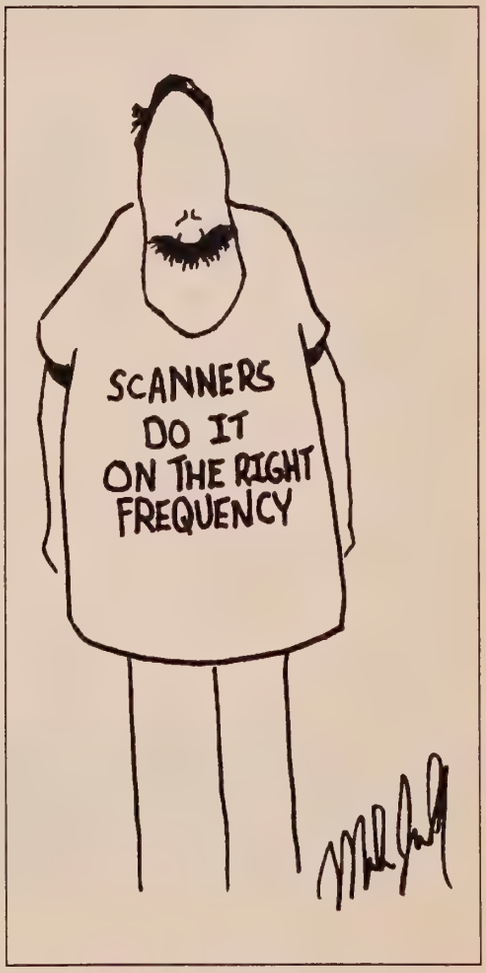

AOR AR8000 NOTES

Helpful Topics For The AOR AR8000

How To Fix Slipping Knobs; Opto Scout/8K Reaction Tuning Caveat.

by Steve Donnell, WA1YKL

Many owners of the AOR AR8000 have reported problems with the volume and squelch control knobs. They develop a condition where they do not properly grip the shaft of the volume or squelch control potentiometers. The cause of this has been identified as a small amount lubricant that seeps out from the internal wiper portion of the volume and squelch potentiometers. One easy fix for this has been to clean the upper shaft of the potentiometer and the rubber knob with a bit of alcohol, apply a tiny bit of Super Glue to the very top end of the potentiometer shaft, then reapply the knob. This will glue the knob in place, preventing future slippage problems.

While this approach is very simple and reportedly works quite well, one problem that I saw with it is that with the knobs glued in place, future modifications, and any possible repairs that required the removal of the 8K's IF/Audio PC board, would be very difficult. I thought, why not simply replace the volume and squelch adjustment knobs with ones that would not be affected by the lubricant? I was also interested in seeing if I could find a different physical style of knob for the 8K, one that might be a bit easier to use.

The shaft on the 8K's potentiometers has a diameter of .235 inches. There is also a large flat shank cut into one side of the shaft that is needed to hold the knob in alignment. Since the knob is made from a nonridged rubber-type material, when the lubricant permeates the rubber, it allows the knob to freely turn around on the shaft. This was first noticed when I could not activate the ON/OFF power switch, which naturally requires a bit of extra torque.

The search for a better knob for the 8K was a bit more difficult than I thought it would be, since there are few knobs available that will match the shaft style of the 8K's potentiometers and of the size needed to fit properly on the top of the 8K. Compounding this situation was the realization that the alignment of the shank cut on the 8K's potentiometers was not the same as found on some similar control shafts. What at first appeared to be a good choice for a replacement knob - those used on the volume and squelch controls of the Uniden BC3000/9000 scanner - proved to be unacceptable because their indicator arrows would be 180 degrees out of alignment with the actual set point on the 8K's controls. This, of course, is due to the difference in the orientation of the shank cut into the shaft of the control potentiometers used on the Unidens.

With some additional effort and a bit of luck, we did find what we feel is a vastly improved style of volume and squelch control knob for use with the AOR AR8000. These are the function knobs used on the Icom IC-R100 receiver. They are made from hard plastic, which provides a solid fit and grip on the 8K's control shafts. The knobs are a fraction of an inch taller than the original knobs, and while they are a bit narrower, they have some very fine-lined grooves cut in them along their vertical axis. This make actuating them with two fingers quite easy. The narrower diameter of the knobs also helps to reduce crowding on the top area of the 8K's case, and the differences in the tactile "feel" of the new ones makes identifying the knobs "in the blind" a bit easier. This advantage may be more easily noticed if you only replace the knob used by the 8K's volume control. My recommendation, however, is that you replace both knobs, leaving the original one on the 8K's rotary function knob.

These new knobs can be ordered from Icom America by calling them at: (206) 454-8155. The part you want to order is described as an N152 knob, for the IC-R100, with an Icom part number of 93009420. The cost of knobs is only $1.15 each.

Opto Scout/8K Reaction Tuning Caveat

Our ever-alert Editor, Bob Gehri, brought to my attention the other day what might appear to be a small bug in the operating firmware of the OptoElectronics Scout. It is noticed when the Scout is connected so as to automatically program the receive frequency of the AR8000. Bob noticed that when the Scout Reaction-Tunes a frequency into the 8K, it will always set the 8K's operating mode to NFM (Narrow FM). Even if the 8K had previously been set to Auto-Select it's operating mode. The problem is that if the Scout locked on to signals from certain frequency bands, such as those in the Aeronautical band or even the CB band, where you would typically want the 8K to detect signals in the AM mode, the 8K would always set the 8Ks' mode to NFM.

Bob noted that it appeared that the Scout was downloading a command into the 8K to change its operating mode from Auto Select to NFM. Additional testing of the Scout's Reaction Tuning capabilities showed that the command to shift the 8K out of Auto Select mode occurred ONLY upon the initial "boot up" of the Scout. If the data transfer cable between the Scout and the 8K were left disconnected during the powering-up the Scout, then the 8K would not be changed from Auto Select. After the Scout has completed its boot-up cycle, connect the frequency data transfer cable between the CI-V port on the Scout and the serial data port on the 8K.

Doing a bit of reverse logic thinking about the Scout's programming, I quickly realized why OptoElectronics designed the Scout this way. It was simply because that as the 8K arrives in the US, the default Auto Select programming of it's tuning steps and operating mode are, in some portions of the 8K's operating range, quite different from those used in other parts of the world. One example of this is that if you program in a frequency slightly above 154 MHZ into the 8K, and if the 8K is set to Auto Select the operating mode, the selected mode will be AM, not NFM as used in the USA. The firmware in the Scout merely tries to minimize this condition.

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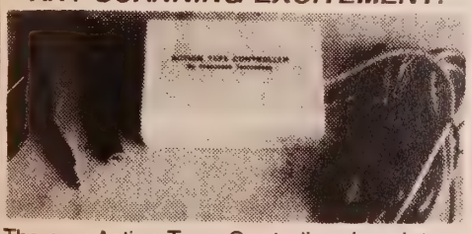

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PRODUCT REVIEWS

Radio Shack PRO-26 Scanner Book Review: Monitoring The Feds

by USSN Staff

PRO-26 Scanner

This month we do a belated review of the PRO-26, Radio Shack's top-of-the-line handheld scanner. Technical guy, Steve Donnell, did a review of the PRO-26 a while back, including a comparison of the '26 and its closest "sister" model from the same manufacturer, Uniden. But we felt obligated to do one of our "lite" reviews (for the technologically impaired), pointing out the radios features and its pluses and minuses, as we always do. We were loaned a PRO-26 by our friends at Pioneer Data, (shameless plug follows), who may be contacted at 1-800-930-5115—call before you buy elsewhere!

The PRO-26 has 200 channels, arranged in ten groups of 20 channels each. Coverage is from 25 to 1300 MHz (that's 1.3 GHz), allowing you to receive that rarely used 1.2 GHz ham band, plus listen in on those ever-popular TACAN's.

There are a whole host of neat features, such as AutoStore, which will automatically store frequencies found during the Search mode, and Search Skip, which stores up to 50 frequencies that will then be skipped over while in the Search mode.

The search step is selectable (5, 12.5 or 25 kHz) as is the reception mode (AM, Narrow FM or Wide FM). A Data Skip function causes the scanner to skip over unmodulated or data signals while in the search mode. The Weather key causes scanning to jump immediately to the seven National Weather Service channels at 162 MHz. The Scan Delay is programmable, either two or four seconds delay after a transmission stops.

Plus, there are also the usual features that we have become used to in most of the Radio Shack scanners, such as the ten Monitor memories, a programmable Priority channel, Direct Search and Lock-out channel review.

Let's get right down to the nuts and bolts and see how this thing works.

Ease Of Use

The keyboard is laid out as well as has come to be expected of most Radio Shack scanners. Most functions are easily accessible, the exception being the three or four "hidden" functions that you have to go through the song and dance of holding down certain keys while turning the radio off and on to use. Four functions are accessible through the use of the Shift key (Shift, One, to access the Mode Select feature, for example)

As usual, the controls and labels on the top panel are "backwards" - that is, they face away from you when you are holding the radio in front of you. When it is clipped on your belt, the radio is facing the other way and the controls are oriented correctly. Apparently they feel it is more important that this mode of use be accommodated, since Radio Shack designs all their handhelds this way. (What if you don't wear a belt?) (Yeah, I know, your pants will fall down.)

When a frequency is entered, the default reception mode and frequency step are selected. The reception modes (which, of course, are user-selectable and can be changed to whatever you wish) are AM, N (Narrow) FM and W (Wideband) FM - for TV or FM Broadcast reception. Search frequency steps are 5, 12.5 and 25 kHz, plus either 200 kHz or 6 MHz when in the WFM mode in the FM Broadcast or TV bands, respectively. The default frequency step is not always the best choice. In the VHF or UHF Aircraft bands, 25 kHz would be the best choice, but 12.5 kHz is selected.

The manual is well-written and understandable. The only problem we could find is the inability to locate any reference to the HyperScan or HyperSearch functions! They are described in the Introduction section on Page Two, but are never mentioned again in the remainder of the book! I guess they figure all you need to know is On, Off, Off, On. I mean, what else is there? But they should have explained

Front view of the PRO-26, with Radio Shack's distinguishing "backwards" top-panel controls.

this. Plus the fact that you have to be searching in 5 kHz steps to enable the HyperSearch, and the "beep" that you get if you aren't.

A couple of other things are confusing. To review the channels locked out via the Search Skip feature, you press Shift, then RVW (Review) and then use the arrow keys to step through the frequencies. To review the channels locked out during normal scanning, you press Shift, RVW, but then step with the "RVW" key. These are things you just have to remember.

A couple of the other functions are "hidden," such as the Keylock and the global channel unlock, which are accessed by pressing and holding the marked keys. Other features are concealed even better, such as the AutoSort or the four-second delay, which are enabled by holding certain other keys while turning the radio off and on. The keys, of course, are clearly labeled, but you wouldn't know the feature was there if you weren't told about it!

The only serious programming problem we found with the PRO-26 is the fact that many times the radio will not allow you to program in a frequency in other than the default increment, an impediment that will cause endless frustration if the cause is not readily apparent. If you go to a channel with, say, a 460 MHz UHF frequency programmed into it, the frequency step default of 12.5 kHz is selected. If you then try to enter 410.095 (a local National Weather Service link, offset to alleviate an intermod problem), the radio rounds it off to 410.0875! And it WON'T let you enter the desired frequency until you change the default search step of the original frequency, in this case, to 5 kHz. Radio Shack has been doing this in many of their recent models, but it is a bit more aggravating in the PRO-26 because of the fact that you have to go through all those keystrokes (Shift, Step, Step, Shift, etc.) to change the step, before it will let you enter your desired frequency! This problem isn't all that rare of an occurance, either, although it usually only occurs when trying to program in a new channel in the same band. If you try to program in an aircraft frequency into a channel with a highband frequency in it, the new default of 12.5 kHz will be selected.

New search steps are not saved to memory, by the way. If you program in 167.000 MHz into a channel, to use as a starting point for direct-searching the 162 to 174 MHz band, and select the proper step increment of 12.5 kHz, it is not saved. The next time you go back to that channel, the search step is back at 5 kHz.

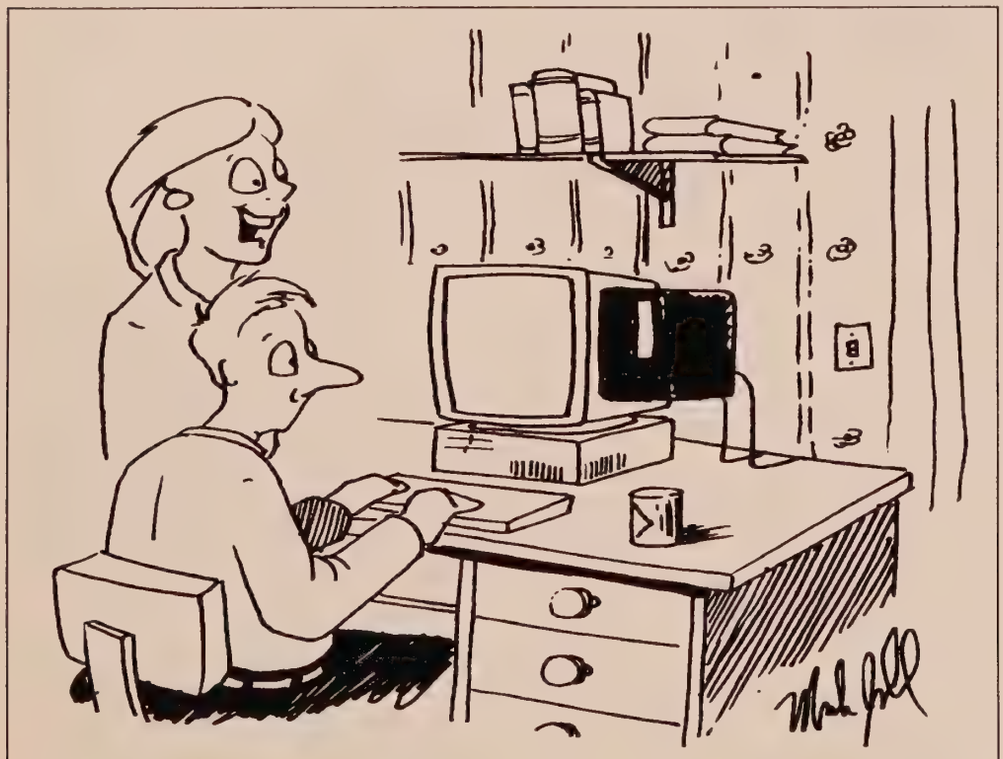
These are minor little annoyances that you can probably live with but I, for one, would like to know about them before I decide whether I want to buy a radio.

Quality of construction

Overall, the quality of construction is very good. There are only a couple of minor problems or potential problems. One, of course, is Radio Shacks continued insistence on using the type of BNC connector with the forked center contact, instead of the usual, circular contact. With use, the contact spreads apart resulting, obviously, in loss of contact. You then have to use a pick or similar tool to bend the contact back together again. This is a particular problem with a handheld scanner since, if you use a vehicle-mounted antenna while mobile, you are going to be doing a lot of plugging and unplugging of connectors.

To top it off, the connector is not easily replaceable in the PRO-26. The connector is mounted on a folded metal bracket, part of what passes for a chassis. This is great for durability, but since the bracket is about an eighth of an inch below the plastic top panel, you are going to be hard pressed to find a replacement BNC connector that is long enough from the mounting flange to its top to extend far enough above the top panel.

We also have some real concerns about the design of the battery compartment. It is unique in that two of the AA batteries go inside the removable compartment cover and two mount inside the radio. Contacts at the top and bottom of the cover complete the connection, along with providing the possibility for endless problems with reliable contact. Inside the radio, the connection to the ground (PC board chassis) is made with a coiled spring contact. All of these could lead to some pretty serious problems if the radio



YOU WANTED TO HOOK YOUR SCANNER TO YOUR COMPUTER SO I USED VELCRO

should ever happen to get wet. All I can suggest is: Don't do that!

As mentioned, the PRO-26 uses four AA batteries (6 Volts), as opposed to the five or six usually used in portable scanners. It still uses a 9 volt DC power supply, though, so you can use that Radio Shack AC wall adapter you had to buy to run your last Radio Shack scanner, the one with the negative center contact. (This is important.) The radio only draws around 85 milliamperes in the NFM or WFM modes, 90 ma. in AM, with a maximum of approximately 130 ma. at full volume. The rated maximum audio output is a puny 250 milliwatts, but the audio is crisp and clear as long as the volume is not turned up over half way, after which point you can forget about it.

The belt clip is plastic. Curiously, it is not installed on the radio. Instead it is packed separately, with the necessary mounting screws. I didn't know that "some assembly is required"!

The display is a window approximately 1/2 inch high but the LCD characters are very large, making this one of the most easy to read displays

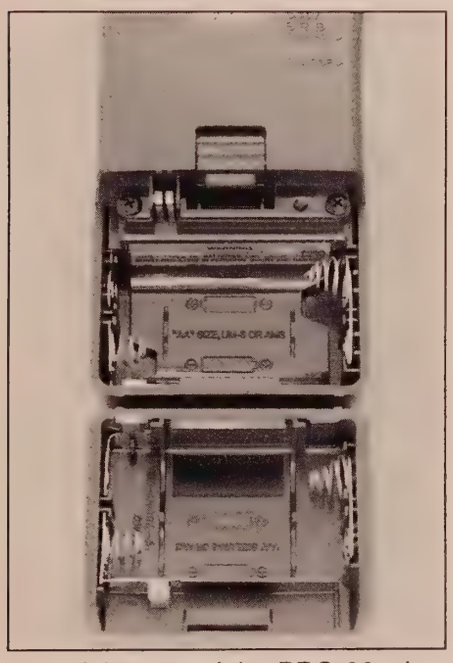


Photo of the rear of the PRO-26, showing the inside of the battery compartment and the removable back cover, which holds two of the batteries. Contacts at the top and bottom of the cover mate with contacts in the radio. Inside the radio, a coiled spring completes the battery circuit to the radios chassis—all potential intermittent connections.

we've seen in a portable scanner. The display lighting (two orange-tinted LED's) provides more than adequate illumination for nighttime use. The backlighting turns off after 15 seconds, if no other keys are pressed.

The Features
(and the problems with them)

There are SO many features in the PRO-26 We'll just have to run through them, in a semi-organized manner, and point out the advantages of each, along with the problems noted, and leave it up to you, the likely buyer, to decide the significance of each.

Scanning

The arrangement of the channel banks is probably just about perfect, 20 channels to a bank. Individual channels may be locked out of the scan cycle, if desired, and the handy lockout review feature allows you to step through the locked-out channels so you don't lose track of them or forget about them. This is all too easy to do, and with 200 channels, it's pretty hard to find them again! An even handier "global" unlock allows you to unlock all of the locked-out channels in the banks currently being scanned by pressing and holding the Lockout button. (This is one of those well-hidden functions!)

Noted everywhere on the packaging and in the manual is the fact that the Cellular Telephone band is excluded, but what they don't mention is that so is the Commercial Aviation Radio Telephone service at 849 to 851 MHz! And, as usual, they are sloppy with their deletions! The deleted frequencies include the band from 868.9625 through 896.0875 (and the paired frequencies, 45 MHz lower). As you can see, they delete the last couple of channels in the 868 MHz and the first couple of channels in the 896 MHz Land Mobile bands. WHY does Radio Shack keep doing this??

The one feature we were really impressed with is the Autosort. This is really slick. Autosort causes the scanner to scan the programmed channels in frequency order, not in the channel order in which you may have programmed them. This allows for more efficient operation of a scanner, since the VCO doesn't have to work as hard to track the programmed frequencies. (I'm not getting too technical here, am I?) What really impressed us is that the PRO-26 leaves the frequencies in the channels in which you programmed them. When scanning, it jumps back and forth to each channel, scanning them in frequency order, within each bank

It's kind of an obscure feature, another well-"hidden" one. To enable it, you turn the radio off, press and hold the "Auto" button, and turn the radio back on. Not too intuitive. But at least it IS selectable. You can turn it off when you wish. This way you can scan that trunked system in which the frequencies aren't rotated in exact, upward frequency order, or program that input frequency you are trying to verify in Channel One and the repeater in Channel Two, and not have the Autosort feature rearrange them for you. That was the main problem with this type of feature in many earlier scanners, which rearranged the channels for you, giving you no option.

Searching

Autostore allows you to store the frequencies found during search into the scan banks you select. The feature works well. Radio Shack doesn't make the same mistake made in the ill-fated PRO-2035 from GRE, where the same frequency would be stored over and over again, each time it stopped on the channel! Each frequency is only stored once.

A couple of very minor drawbacks are that it requires an empty or unused channel bank (or banks) in which to store the "found" frequencies and the fact that it doesn't stop on an active frequency, even for the duration of the conversation. It moves on immediately. I guess that they figure that this feature will only be used for unattended operation. And for that, it's great. Park your car at the mall, take off the antenna to limit your reception range and search the 460 to 470 MHz band. When you get back to your car, you can then see if you found that elusive security frequency.

The Search Skip feature lets you store up to 50 frequencies in a special memory. These frequencies are skipped over whenever you use the Direct or Limit Search. This allows you to search through the 406 to 420 MHz band, as an example, and skip over all those point-to-point links that transmit continuously. When you come across one, you just press Enter, and it goes into the Search Skip memory. It's neat, but also not without problems. If you have been searching the 406 MHz band, you'll probably want to skip over all those pesky links, birdies and other continuous carriers. If you then search the 162 MHz band and happen to fill up all 50 Search Skip memory locations with more frequencies, it will continue to enter more, over writing the earlier-entered channels. And it doesn't give you any indication at all that the bank is full and that it is over writing the first channels! When you go back to searching the 406 MHz band, you'll find out, I guess. Also, there is no way to individually add or delete frequencies from the memory. (Of course, you can manually add a frequency by stepping to it and pressing "Auto.") I deleted the local airport weather (ATIS) frequency so it wouldn't lock up on it while searching. Later, when I WANTED to listen to it without having to enter it in a channel (I just went to a channel with an aircraft frequency in it and did a Direct Search to go to it) the radio, of course, skipped right over it. And there's nothing you can do about it until, perhaps, the day comes when you've added additional frequencies to the Search Skip bank and it is overwritten!

The HyperSearch feature is a strange deal. It only works if you elect to search in 5 kHz steps. In this case it blazes along at 300 steps a second! (Normal mode is 100 steps a second.) But you've got to evaluate its usefulness. If you are searching a portion of the 225 to 400 MHz band, where the normal channel spacing is 25 kHz, why would you select the 5 kHz increment and have your scanner stop short of the actual frequency on strong signals, plus increase the odds of finding that many more birdies? Why not just search in 25 kHz steps and forget the "HyperSearch?" The effective search speed is about the same in our tests. The fact is that you'll probably rarely search in 5 kHz increments outside of the 150.75 to 162 MHz band, or possibly VHF low band.

Plus, the feature has to be enabled. You start your search, select your search step (5 kHz, if you want the HyperSearch to work), then press the "H/S" button. Why not just have it work anytime the 5 kHz step is selected?

The little "quirks" aside, there is only one problem with the Search function that could be termed "major." And that is the fact that in spite of the fact that the PRO-26 has programmable search limits and programmable search steps, you can NOT search the 12.5 kHz offset channels in the 460 to 470 MHz band in 25 kHz steps. Or the regular channels in the 851 to 869 MHz band in 25 kHz increments. In both cases, if you select the 25 kHz step and start on a 12.5 kHz offset channel (such as 461.0125 or 851.0125 - the latter not even being an offset!), the scanner rounds off the frequency and searches from 461.025 (or 851.025) MHz in 25 kHz steps. AOR is about the only radio made that doesn't do this. It's VERY irritating, not to mention that it makes the radio absolutely useless for searching the low power offsets in the 460 MHz band. This is no problem if you don't mind searching in 12.5 kHz steps and stopping on every repeater in town, or if you'd rather search the 851 MHz band in 12.5 kHz steps when you could search twice as fast in 25 kHz steps.

And there is a real problem with trying to change the frequency step while Direct-Searching. (This aggravates the "programmed channel default increment" dilemma, mentioned earlier, too.) Sometimes it is particularly difficult to get the radio to do what you want, since the default mode is not easily overridden at times. If you want to program the regular Limit Search to scan from, say 50 to 66 MHz–across the Six Meter Ham band and into TV Channels 2 and 3–you may select the 25 kHz increment. You can then search for those National Guard units who pick frequencies within unused TV channels. (Since their "FM" (or Low band) equipment usually covers the range from 30 to at least 70 MHz, they love to do this!) In the PRO-26 Direct Search mode, however, it's a real trick. When you press the arrow key to start the search, it immediately begins searching, in the default step for that frequency band. To change it, you have to press Shift, then the increment desired (25 kHz, for example), then the arrow key again. If you don't change the step and use the default increment, it CHANGES when it reaches the predetermined points (54 MHz, for example, where the TV Broadcast band starts. The frequency increment immediately steps to 6 MHz, stopping on each TV sound carrier frequency. If you should happen to start within the TV band, the situation is even worse. Before you can even press the Shift button, the scanner is at 87.75 MHz (Channel 6)! (The search doesn't stop when you press the Shift key.) If you then change the search step, you have to go all the way back to your desired starting point in 25 kHz steps.

This problem can be a real nuisance. Every time you want to do a Direct Search of the 162 to 174 MHz U.S. Government band, you have to quickly change the search step from 5 to 12.5 kHz. One "solution" is to start the search with the squelch open, which gives you a chance to change the increment before the radio "takes off." Before you ask, they DID have the foresight to make the default increment in the 470 to 512 MHz "UHF-T" band 12.5 kHz. Portions of this band are used for land mobile use in the ten largest urban areas of the country. (If they had made the default 6 MHz, they would have had a LOT of angry scanner owners.)

Other Features

A neat feature is the programmable attenuator. ("Programmable" meaning that you can select or deselect it for each individual channel, not that you can select the amount of attenuation!) They note in the manual that this is use-

ful in the WFM mode since, of course, most FM and TV Broadcast signals will be quite strong. Obviously they wouldn't want to admit the possibility that the radio might suffer from intermodulation interference in a dense urban RF environment, but that's where the feature is really valuable. Now you can just enable the attenuator on those high band channels that pick up all that paging intermod and really clean things up (most of the time). Sensitivity, of course, will suffer, but many times the signal cannot be received clearly (or at all) without the attenuator on anyway. You probably discovered this years ago with your 2004. But at least with the PRO-26, the attenuator can be enabled on a channel-by-channel basis.

The Data Skip, of course, is the feature that always gets everyone excited. Finally, can I search the 851 MHz band without my radio stopping on all those GE and Motorola control channels? I hate to break it to you, but, no. It won't work on trunked system control channels, only on signals with a relatively constant audio content, such as a steady tone. It also only works in the FM mode.

It does, however, work really well on dead carriers, causing the scanner to move right past those pesky control links. Of course, in the Search mode you can lock these frequencies out anyway with the Search Skip function, but what if you want to stop on the carrier each pass to check for activity? It works great for that. The only problem encountered with Data Skip was that it works a little too good. They probably should have lengthened the delay time, since it tends to move on during pauses in some conversations! Or at the end of a conversation, before the repeater times out. It moves on and you miss the reply!

And it only works during the Search mode, not regular scanning. (Boy, if it DID work on trunked system control channels, and worked during scan, wouldn't that by great? No more screwing around locking rotating control channels in and out on a daily basis. Oh,well.)

How Does It Work?

Sensitivity is excellent. But it is a little more vulnerable to intermodulation interference than is desirable. The selectable RF attenuator helps here. As Steve noted in his March review, Uniden's BC-3000 has an added RF amplifier stage for 800 MHz while the PRO-26 uses a mixer stage with slightly higher gain.

If you were thinking about using the radio at home with an outside antenna, forget it. The PRO-26 is EXTREMELY susceptible to image interference. Like most of the GRE-manufactured RS models of similar design, it will receive 800 MHz signals in the 127 MHz (and a couple of other) ranges where the reverse image of an interfering signal falls within the passband of the receivers I.F. But the '26 also receives loads of other signals where it shouldn't. Most prominent, of course, are cellular signals. Since cellular transmitters are located to provide the best coverage to most areas of a city, they also provide the best potential interference. And the PRO-26 does an excellent job of picking it up!

In the range above 1 GHz (1000 MHz) it will do a fairly good job of picking up 880 MHz cellular signals, caused by these signals mixing with the second harmonic of the first local oscillator. But in the 300 MHz range, signals from across the entire 800 MHz band are received, including relatively weaker land mobile repeaters in the 851 MHz band. They are received approximately 509 MHz below their actual frequency, twice the I.F. frequency. What is most disconcerting about this, though, is the fact that these signals shouldn't be received at all in this range, since they have to pass through an RF input filter - in this case one tuned to pass 318 to 550 MHz.

All of these problems could be solved by adequate filtering of the local oscillator(s), a problem that is admittedly difficult in a small handheld radio, but not insurmountable.

The PRO-26 picks up surprisingly few "birdies," internally generated signals that prevent reception. The list of them in the instruction manual is actually pretty complete! I only found a couple that weren't on it.

In Summary

The PRO-26 is far more sensitive than Radio Shack's next-cheaper model, the PRO-60. By the same token, it is much more susceptible to intermodulation interference. The attenuator feature helps alleviate this problem (at the expense of the greater sensitivity!).

The image problem is fairly serious and severely impairs the ability to search the 225 to 400 MHz band in particular. Much of this interference is even encountered using the supplied whip antenna. If you don't care about the ability to search this band, or only listen to programmed frequencies on which the interference does not occur, then this is not an issue.

The PRO-26 has a lot of neat features, but a couple of them have limitations that obviate their advantages. (The fact that you can't search the UHF 12.5 kHz offsets in 25 kHz steps comes to mind immediately as the most serious.)

As with most Radio Shack scanners, operation is straight-forward and simple. Since this is their top-of-the-line model, though, with loads of nice features, not all of them are "user friendly" or readily accessible, as we have noted. To us, this is not a serious impediment. We've pointed them out - you'll have to evaluate this for yourself.

Overall, the radio has excellent sensitivity, fair intermod rejection, fair-to-poor image rejection, good audio quality and good-to-excellent ease of use. We rate it Three out of Four Stars.

Radio Shack model PRO-26. Catalog Number 20-506. List price is $449.99.

Monitoring The Feds

Another, more recent item submitted for our review is the book "Monitoring the Feds," by John C. McColman. This book is unusual in that it is not a run-of-the-mill frequency directory but rather a guide on, as the books subtitle states, "How to use your scanner or shortwave radio to eavesdrop on the Federal Government." As the author says, "the purpose of the book is

to gather in one place the information necessary to begin (scanning the federal spectrum)."

Nicely printed and tape-bound, Section 1 of the book supposedly gives you all you need to know to monitor the federal spectrum. The first chapter gives a little background on federal agencies, or at least those detailed in this book. The next two chapters give short explanations of the spectrum used by the Government and how it is administered, followed by a list of the available frequencies in each government band. (No mention is made of the 923 to 935/941 to 944 MHz bands, shared with the private sector and seeing increased use for fixed, control links.)

Chapters 4 and 5 contain many hints and tips for monitoring government agencies, plus a few words about the ethics of monitoring. Scattered among these first chapters are various lists of agency frequencies that seem out of place, but are usually related to the topic being discussed.

Section two of the book is a detailed list of the various departments and agencies of the U.S. Government, with a short description of each agency or service, its make-up or organization and its duties. Other handy information includes lists of regional or district offices or locations of various facilities administered by the agency. The frequencies most commonly used around the country by each agency are listed. The frequencies aren't all-encompassing, but should give the novice with any smarts an idea where to start looking.

The third portion of the book is the appendices. It includes a list of federal agencies with NTIA frequency assignments, a list of abbreviations and acronyms, a short glossary, a listing of NOAA weather stations and, most important, a list, in frequency order, of all the agencies listed in the book. Very handy!

Monitoring the Fed is not exactly all-encompassing, either as a frequency directory or as a beginners handbook. If it was intending as a primer, as the author states, considerably more information and helpful searching hints could (or should) have been added. Nevertheless, what is presented is useful, and the frequency data is highly accurate.

Some of the information could have been organized a little better. The list of assignable frequencies is in one section, the channels reserved for trunked systems in another, a list of shared/itinerant frequencies in another. This could be pulled together into a little more useful chapter.

Although it is not exactly what we would call comprehensive, the book should still be valuable to the beginning scanner listener, or even the experienced listener venturing outside the realm of public safety listening into the relative unknown of federal government monitoring for the first time. There are too many monitorists out there who have listened to the PD and fire department for years, but have absolutely *NO* idea where to search to find the IRS. This is the ideal book for them.

We rate it Two and Three-Quarter Stars out of four.

"Monitoring the Feds"
by John McColman
ISBN 0-936653-70-1
$17.95 plus $3 shipping and handling.
Tiare Publications,
Box 493,
Lake Geneva, WI. 53147.
1-800-420-0579

USSN

Why a Combined September/October Issue

(See page 45 for story on The Scanner Journal)

U.S. Scanner Publications has agreed to honor the remaining RCMA Scanner Journal subscriptions. We are going to be including much of this magazine into the pages of U.S. Scanner News. We attempted to organize in time to accomplish this in this issue. This resulted in our putting off our deadlines until it was apparent we could not have The Scanner Journal ready this month. In order to keep our newstand cover date competitive with other magazines we decided to go with a combined issue. Our subscribers will still receive a full 12 months on their subscriptions. We will be adjusting your labels soon to reflect this. See below for how to read your labels.

Please be patient during this transition. If there are any questions about how many months you should have, just pencil out your months on paper (write 09, 10, 11, to your ending month) and count the months due you. This will keep calls to us to a minimum and allow us to concentrate on including The Scanner Journal in your magazine.

How to Read Your Mailing Labels

AB-CD-EF-GH-IJKL-XXXXXX

The AB is the expiration month. This issue is 08 which is supposed to be the September issue (see above). CD is the expiring year,. EF is the month you started. GH is the year you started. IJKL is your subscription number. XXXXXX is a comment field. Example: if your label now reads **12-96-11-94-4532-Sub** you would still be receiving 09, 10, 11, and 12.

A new subscriber receiving your first issue would read **07-97-08-96-XXXX-Sub**. Penciling it out you would receive issues 08, 09, 10, 11, 12, 01, 02, 03, 04, 05, 06, 07 = 12 issues.

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FCC NEWS

The Latest News From The FCC

by USSN Staff

The FCC has adopted rules creating a new Family Radio Service in the 462 and 467 MHz ranges, on and between channels currently allocated to the General Mobile Radio Service (GMRS). According to the FCC, the new service will help fill a market niche in short distance, personal communication needs. It will enable families, friends and associates to communicate among themselves within neighborhoods and while on group outings." They envision the FRS as being used "at activities where group members become separated, either planned or inadvertently. The FRS also would be useful to hunters, campers, hikers, bicyclists and other outdoor activity enthusiasts who need to communicate with other members of their party who are out of speaking range or sight but still in the same general area."

Tandy Corporation was the chief petitioner for the creation of the new service and a number of other radio equipment manufacturers supported it, including Motorola. Opposition came from REACT and the Personal Radio Steering Group, the latter representing licensees in the GMRS.

The General Mobile Radio Service is currently allocated eight channel pairs, 462.550 through 462.725 MHz, paired with the mobile-only frequencies 5 MHz higher at 467.550 through 467.725. In addition, GMRS licensees are authorized to use any of the seven 12.5 kHz-offset channels between the 462 MHz frequencies, 462.5625 through 462.7125 MHz, for low power simplex use. The new Family Radio Service is being allocated these same seven offset channels, plus the seven currently-unused offsets at 467 MHz, for a total of fourteen simplex channels. GMRS users were concerned about the likelihood of interference from shared use of the same frequencies, as well as the potential for interference to GMRS repeaters from FRS operation on the 467 MHz frequencies, immediately adjacent to the repeater input frequencies.

The FCC responded to these concerns by noting that transceivers in the Family Radio Service will only be allowed to transmit with a maximum power output of only 500 milliwatts (a half a watt), with a permanently attached, unity-gain antenna. In order to cause interference to a GMRS repeater, the FRS user would practically have to hold his antenna up to the GMRS antenna tower!

Furthermore, in order to minimize any possibility of adjacent channel interference, transmitters in the new service will be required to limit their modulated frequency deviation to 2.5 kHz, with a maximum frequency response of 3.125 kHz. This is much narrower than the 4 or 5 kHz deviation allowed in most of the land mobile radio services, including the GMRS. The allowable transmitter frequency tolerance in the FRS will be .00025%.

Tones may be transmitted to signal other units. Phone patch service is not allowed. Licenses will not be required in the new Family Radio Service, since they would serve no purpose and impose a burden on both the FCC and the public.

The rules for the new Family Radio Service state that it is a communications service for facilitating family and group activities, but nothing else in the new rules in Part 95 explicitly prohibits use of FRS transceivers by business and other users, even though that is pretty much the effect. You can bet than an $89 FRS radio will look a lot more attractive to a construction company or warehouse owner than a three or four hundred dollar commercial radio. Also, nothing in the Final Order addresses the issue of interference to GMRS users already allowed to operate on the 462 MHz offset channels, other than the fact that GMRS users are allowed significantly more output power and can override an FRS unit. Many GMRS licensees use these channels for short-range, unit-to-unit communications, which is why the FCC allocated these frequencies in the first place a few years ago. Now they are going to have to be shared with the CB-style chatter from an unlicensed radio service.

The Family Radio Service

Channel	Frequency
1	462.5625
2	462.5875
3	462.6125
4	462.6375
5	462.6625
6	462.6875
7	462.7125
8	467.5625
9	467.5875
10	467.6125
11	467.6375
12	467.6625
13	467.6875
14	467.7125

The FCC has amended its rules to allow the use of signal boosters in a number of radio services, including the Part 90 land mobile radio services. Signal boosters are low power transmitters that retransmit the originating signal on the same frequency. They are used to provide coverage to areas shielded by terrain, or in buildings, underground parking structures, etc. Boosters are currently allowed in the Broadcast services, but are also allowed in the Cellular RadioTelephone service and on the ten Business Radio Service channels at 461 MHz that are reserved for use at airports.

Under the new rules, the use of boosters will now be allowed by all Part 90 (Private Land Mobile) licensees and Part 22 paging systems operating above 150 MHz. In the case of paging systems operating in the 931 MHz band, the maximum radius of a boosters coverage is limited to .6 mile. The use of boosters will now also be permitted by Part 94 Multiple Address System licensees in the 928/952 MHz band. Boosters that transmit a broadband signal will also be

allowed, but only in enclosed areas such as tunnels, buildings, etc. The maximum power output of a booster will be 5 watts ERP, up from the 500 milliwatts proposed originally.

No separate license will be required to use a signal booster since, of course, the party is already licensed to operate on that frequency. The booster must not extend the licensees' service area beyond that already authorized.

The National Telecommunications and Information Administration has notified the FCC that it is relinquishing the federal Governments equal-primary status on 125 frequencies in the 220 to 222 MHz band. NTIA is the agency responsible for managing the governments use of the radio spectrum.

When the FCC allocated this band in 1991, they set aside 60 of the 200 channel pairs for nationwide systems, with 10 of these reserved for the Federal Government. (Channels in this band are spaced only 5 kHz apart, with base stations operating in the 220 to 221 MHz segment and the mobile units one MHz higher, in the 221 to 222 MHz band.) The remaining 140 channels are reserved for local, trunked systems. Fifteen of these 140 channels are reserved for the Public Safety Radio Services and the rest are available for both Government and non-government users. Last year, the FCC released a proposal to restructure the channels in this band and, in keeping with their trend over the last couple of years, assign the available frequencies by auction (even the ones with applications pending for them).

The importance of NTIA's action, of course, is that these "local" channels now will be worth significantly more in the auctions, should they occur. The FCC is proposing to license these channels by geographic area and no one would pay much for a five-channel trunked group, knowing that the Soil Conservation Service might put up a repeater on one of their channels over in the next county. NTIA's decision clears the way for the FCC to adopt auctions in this band, with little impact likely for Federal users. Most Government agencies have significant investments in radio systems already operating in other land mobile bands and would have been very unlikely to use channels in this band, anyway.

In our unusual case of the month, the FCC has denied the application of the State of New Hampshire for a number of frequencies allocated for Public Land Mobile (mobile telephone) service. In 1993, New Hampshire applied for licenses for the frequencies 152.51, 152.63 and 152.69 for a statewide, multi-agency communications system. These channels were licensed to New England Telephone Company but were vacated when they discontinued IMTS (Improved Mobile Telephone Service) on these frequencies. New Hampshire had asked for a waiver to allow it to operate a Private Land Mobile system on these frequencies. (Actually, they wanted to divide each channel into two channels, spaced 12.5 kHz apart. The normal spacing for these frequencies is 30 kHz. About the same time, a radio common carrier applied for some of the same channels to use for paging service.

When someone applies for a common carrier frequency, this fact is placed on public notice and other companies that were thinking about applying for the same channel, or wish to challenge the first company's application for whatever reason, have thirty days to do so. If another company applies, the applications are considered mutually exclusive and the license is then granted after a hearing to determine the most qualified licensee. In recent years, lotteries are held in almost all cases, since there is rarely any substantial difference among applicants or the service they intend to provide. Hearings would only waste time and cost the applicants more money.

In the New Hampshire case, however, instead of immediately dismissing New Hampshire's application as defective (and asinine), the FCC declared the two applications as mutually exclusive!

In April, the FCC finally decided that New Hampshire's request is "fundamentally inconsistent with the allocation scheme the FCC has adopted for Part 22." (Really?) They first had to investigate the State's allegations regarding the other applicant, since part of their waiver request was based on the claim that there were no licensees or applicants for the proposed frequencies. The fact was the New England Telephone had only recently discontinued their service, and the new company filed their application shortly after that. New Hampshire had also maintained that the other company did not have firm lease commitments for their proposed transmitter sites.

As New Hampshire noted at the time of their application, the state has a varying topography, with mountains over 6000 feet high. Large portions of the state are heavily forested. For these reasons they maintained that a system operating in the 450 or 800 MHz band would be inadequate. The FCC dismissed this concern, stating that many areas of the country are topologically diverse and that 800 and 900 MHz systems serve these areas, although this may require a greater number of transmitter sites. The need to acquire these sites, and the additional cost, is not a valid reason to grant them a waiver to use VHF common carrier frequencies.

By the way, have you checked out the old VHF and UHF mobile telephone frequencies in your area - the 30 kHz-spaced channels running from 152.51 through 152.81, and from 454.375 through 454.650 in 25 kHz steps? In case you may not have noticed, these channels are probably now dead! Almost every major telephone company has discontinued IMTS mobile telephone service. U.S. West, for example, began pulling the plug two years ago, converting their customers to cellular. Here in USSN's hometown, one small suburban telco is still providing IMTS mobile telephone service on three VHF channels.

This is another spot to keep your eyes (and ears) on. More than likely it will be a radio common carrier that will eventually apply for these channels to provide paging service, which is allowed under the FCC's rules. In case you were wondering, the FCC eliminated the "wireline fence" years ago. It used to be that the seven channels starting at 152.03 and the fourteen channels starting at 454.025 MHz were reserved for non-wireline carriers, with the previously mentioned channels reserved for telco's only. This is no longer the case and any type of carrier may apply for any of the VHF or UHF frequencies.

USSN

TECHNICAL TOPICS

Optoelectronic's

Optoelectronics CF–802 And Part One Of Image Interference And Scanners.

by Steve Donnell, WA1YKL

Optoelectronics CF–802

The CF-802 from Optoelectronics is an interesting radio frequency (bandpass)filter and amplifier combination. The filter portion of the '802 passes signals that are within about 12 MHz of each side of 835 MHz. Essentially this works out to 824 - 849 MHz, which just happens to be the frequency band used for transmitting by the mobile/portable user half of Cellular telephones. The signal amplifier function of the CF-802 provides 10 - 13 Db of RF gain across this frequency range as well. See diagram 1, this plots the frequency/gain level of 800 MHz frequencies through the CF-802.

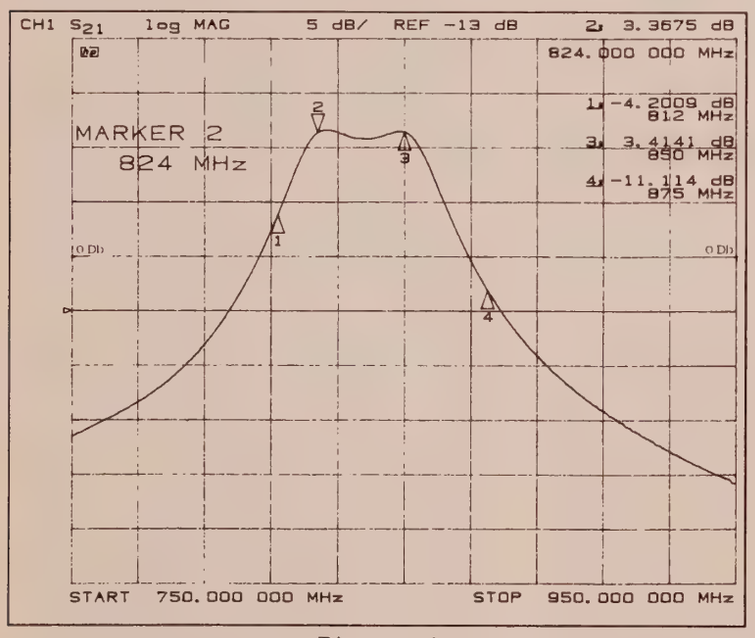

Diagram 1

It may be of some surprise to find that internally the CF-802 consists mostly of a single MMIC(microwave monolithic amplifier IC) and a fixed tuned bandpass filter normally intended for use in the receiver "front end" of a typical Cell phone. While the CF-802 does provide some degree of signal gain all the way down to 812 MHz and up to 860 MHz, the lion's share of it's performance is strictly limited to the 835 MHz area.

Although the CF-802 is meant primarily to be used with Opto's R-10 Interceptor test receiver, the CF-802 can also be used in a similar way with a scanner or a frequency counter to provide some extra pickup range and filtering of undesired signals. Both of which can be particularly helpful when using an Interceptor or a conventional receiver/scanner in an Urban environment. The extra pickup range that the CF-802 provides can be especially helpful in Urban areas that can typically sport many Cellular Base sites or "towers", as the normal maximum transmit power level of 3 watts that a mobile "subscriber" radio will be operating at is throttled back to 100 milliwatts or less. Compounding this dilemma even further,is the increasing popularity of those tiny hand-held portable phones that typically have a maximum transmit power of only half a watt. What all this boils down to is that even with a good receiver, the normal reception range for most 835 MHz band signals is usually only a mile or less.

The CF-802 is packaged in a sturdy metal case that measures only 1" x 1" x 2.25", and having a male BNC connector at one end and a female BNC at the other. This makes the CF-802 readily adaptable for use with most test equipment and scanners. The compact size of the '802 prohibits any available space for an internal battery. Instead a coaxial connector on the side provides a flexible way that any 7 - 12 volt DC source can be used for power. The CF-802 is supplied with several power cable options: One is a standard AC wall transformer. Another is a short cable that has the typical snap "rivets" for connecting to a 9 volt battery. A 9 volt battery can then be taped onto the side,permitting the CF-802 to be used with any scanner.

Even more interesting is a special cable that permits the '802 to be powered directly from Opto's R10 Interceptor receiver. I often had wondered how this was done,I had even tried making my own accessory power cable for the R10 which had coaxial type connectors on each end. The real secret here is this: On the end the cable that plugs into the DC charger jack of the R10,instead of a regular coaxial connector, there is just a single conductor lead that ties onto a tubular/female pin.This special pin slides onto the male center pin of the R10's charging jack, but there is no wider barrel to displace the "cutout" contact on the negative side of the jack. The (-)ground half of this DC circuit hookup is made by way of the shield portion of the RF coaxial connectors. Conceivably you could construct your own special DC interconnect cable of this type to provide easy way to power a preamp like the Jim M-75, which we covered sometime back,for use with the R10 Interceptor. The pin the plugs into the R10's DC seems to consist of a single female pin contact portion of a Radio Shack #274-222 molded nylon connector. It is IMPORTANT to note that the outside surface of this pin

contact is carefully insulated,using shrink tubing to prevent it from shorting out against the negative contact of the charger jack and/or the chassis wall of the R10. Permitting this to occur would result in a VERY bad reaction,as it would essentially place a short-circuit across the R10's batteries. This same DC interconnect technique can also be used with the charging jack on Opto's 3000A frequency counter, but is NOT possible to use this same type of hookup with the Scout signal logger/counter.

Powering the CF-802 by way of a common 9 volt battery may be more universal,but at 9 volts DC the CF-802 draws 37 MA of current. This will drain the capacity most tiny 9 volt batteries in a couple of hours or so. But with the CF-802 tied into the R10 charging jack,the CF-802 sees only about 7.5 volts, which equates to only about 25 MA of current draw, which does little to accelerate the depletion of the R10's internal AA size batteries. For mobile use with a receiver other than the R10,you might do just as well to construct your own DC power cable to operate the CF-802 directly up a vehicle's 12 volt power line. Be sure to include a 1 Amp fuse with this type of setup as well.

In testing the CF-802,connected up to my R10 Interceptor, using a Service Monitor to generate a test signal on 835 MHz, we found that by using the CF-802, the pickup range of our Interceptor R10 was nearly tripled. In field tests,we found that the CF-802 did improve the pickup range of the R10 for signals in the 835 MHz range,but that the total "acquisition" time of most signals was limited to about ten seconds. This of course being the result of most users on these frequencies being mobile. I will say however, that the CF-802 does provide VERY good filtering of all types of signals outside of the 835 MHz band. Even when driving through what would be described as very "hostile"RF areas, the R10 responded only to signals in the 835 MHz band.

I also noticed a similar improvement in using the CF-802 with my BC3000, when searching the 824 - 849 MHz range. The BC3000 can be susceptible to some degree of spurious reception of 900 MHz paging signals when searching this area of the band, by using the CF-802 this is not a problem. An extra bonus that is not realized when using an old Cell phone duplexer for this same purpose, the the amplifier capability CF-802 provides up to 13 Db(x20) of signal gain.

The CF-802 is a gem that can be very useful to those that want improved signal reception in the 835 MHz band. The CF-802 is available from Optoelectronics for $129.00. Contact Optoelectronics at 1-800-327-5912.

Image Interference And Scanners Part One

After reading my June column about 900 MHz cordless phones, Tom Y. from Ohio, wrote to say that he has tried searching the 902 to 928 MHz band but that all he is hearing are cellular phones, which he believes are supposed to be operating in the 869 to 894 MHz range.

You are correct, Tom, that Cellular phones do operate in the 880 MHz area. Your scanner is hearing those signals due to a phenomenon known as "image reception." This will cause many scanners that are designed with a "dual conversion" receiver to hear 869 to 894 MHz Cellular band signals across the 890.4 to 915.6 MHz range. While there isn't too much you can do to prevent this, except to get a scanner that uses a different receiver design, the same conditions that cause this problem to occur can be used to your advantage. You should be able to hear any nearby 900 MHz cordless phones by limiting your search range to just 923.4 to 926.4 MHz. By virtue of your scanner's design, when searching this range you will also be searching across the 902 to 904 MHz frequency range and you shouldn't hear any interference from cellular phones.

Image interference is one of the most common forms of reception interference that can plague a scanner listener. It is typically thought of as some kind of "black magic" and often treated as such in some publications. However, if you are acquainted with the basic process as to how a scanner's receiver operates, and if you can do a little bit of third grade math, then you can EASILY understand the mechanics of how and why image reception occurs. While you usually can do little to completely prevent image interference, at least if you understand why it happens it will help explain why you are hearing certain signals on frequencies where they normally should not be found. In some instances, you can even put a scanner's susceptibility for image reception to your advantage, to receive a frequency range that your scanner does not normally cover.

To understand image reception you first must understand the basic configuration of a scanning receiver. All scanners are designed around a receiver design known as a Superheterodyne, or just Superhet, for short. The idea behind how a Superhet receiver operates is that a wide range of possible receive frequencies are first converted to a new single frequency, which is called the "IF" (Intermediate Frequency). This is done for easier amplification and filtering of the signal you wish to receive. This frequency conversion step is taken care of in the receiver's Mixer stage. Here the intended receive signals of differing frequencies are combined or "mixed" with a signal of a different frequency. This other signal is generated internally by the receiver's Local Oscillator (LO), which is usually a synthesizer circuit. Note that older-design scanners employed manually tuned LO's, or ones that operated at a fixed frequency that was determined by a crystal. Modern scanners use programmable synthesizers, which can be set to receive a wide range of frequencies.

The scanner's LO is programmed to operate at a frequency which is offset from the intended receive signal's frequency by a value that's equal to the receiver's IF frequency. Let's see how this works in a scanner that is designed using a commonly used IF frequency of 10.8 MHz. When you program in a frequency of 162.400 MHz to be received, the scanner's LO (Local Oscillator) will be set to operate at 151.600 MHz. This

can easily be verified by programming another scanner to a frequency of 151.600 MHz and setting it a few feet away from the first scanner. You'll pick-up the signal from the first scanner's LO.

When the 151.600 MHz LO signal is mixes with a desired receive signal on 162.400 MHz, an entirely "new" signal is created on a frequency of 10.80 MHz. This is part of the magic of radio physics. When radio signals on two different frequencies are combined or "mixed," signals on two completely new frequencies are created. These new frequencies are equal to the sum and the difference of the original two. This is how the 10.80 MHz signal that is needed for use by the receiver's IF circuits is created: 162.400 - 151.600 = 10.80 MHz. (The sum frequency is way out of range and is not passed.)

One MAJOR problem, however, is that there is more than one way that the 10.80 MHz IF signal can be created. If a totally different signal on a frequency of 140.800 MHz is present it will also very likely be allowed to mix with the 151.600 MHz LO carrier and produce the same 10.80 MHz IF signal: 151.600 -140.800 = 10.80 MHz. This will result in the scanner receiving a signal just as though it actually existed on a frequency of 162.400 MHz. This is how the condition known as "image reception" occurs.

Image reception gets its name because the interfering carrier is on a frequency that has an exact mirror "image" frequency-wise, from the receiver's LO frequency, as is the frequency of the intended receive signal.

Blaming image reception problems in scanners on manufacturers use of poor design is only partly justified, as image interference can happen in any type of Superheterodyne receiver, no matter what you do. This holds true whether you are using a $200 scanner from Radio Shack or a $2000 receiver from ICBM or Watkins-Johnson. At best, all you can do is minimize the ability of it to happen.

Many types of commercial transceivers also use receivers that are designed using IF frequencies in the 10 MHz area, the same as many scanners. Commercial transceivers, however, usually make use of very selective, or narrow bandwidth, receive signal input filters. These are adjusted to pass only the very limited range of operating frequencies in which radio is to be used on. This significantly reduces the likelihood of an image signal being received. Unfortunately, given the wide frequency coverage range that a modern scanner requires, the use of much narrower signal input filters is simply not practical. In some cases, when a scanner user understands what is occurring - where the image interference is coming from and why it is happening - an external filter of some type can be added with some degree of effectiveness against the interference problem.

Typically, with most scanner models that use a 10 MHz IF, filtering out potential image signals is done fairly effectively on the VHF Low band frequencies, and is somewhat less effective in the VHF High band area. But it is much worse of a problem on the UHF and 800 MHz bands. This is because the signal input filters used in most scanners are much less effective on these bands, resulting in image signal filtering or "rejection" on the UHF and 800 MHz bands that is usually poor to nonexistent.

One way that interference from image signals can be dealt with is by designing a receiver using an IF with a frequency much higher than 10 MHz. A few older scanner designs had IF's frequencies set in the 21 MHz area. The greater the amount of frequency separation between the signals you want to let into a receiver and any possible image frequencies, the easier it is to design signal input filters that will help keep images out.

I have often wondered why most low cost (under $300.00) scanners, with dual conversion receivers using a 10 MHz IF, would not be better off with a IF in the 21 MHz area. Images could be somewhat easier to filter out and the frequencies which most image signals would land on would be frequencies less likely to result in reception problems. One need only look back to a couple of older scanners, such as the Regency HX-1000 or HX-2000. Today, most models of VHF/UHF Ham gear are designed using IF frequencies in the 21 or even 50 MHz areas.

So far, we have only covered the most common form of image problems that can be found in scanners that use "dual conversion" receiver designs. Next time we will look at less-typical image reception conditions, including some that can exist in more sophisticated scanners that use "triple conversion" receiver designs.

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LATE BREAKING NEWS

June 1996; The Last Issue Of RCMA Scanner Journal

by USSN Staff

With an ambiguously-worded postcard, members of the Radio Communications Monitoring Association were notified in late June that the June 1996 issue of the RCMA Scanner Journal would be the last. This came as a surprise to many, even a shock. But their desperate financial situation evidently left the RCMA Board with no other choice.

As explained in the postcard, in an effort to revive declining membership RCMA began selling the Journal in various bookstores. Unfortunately, the distributor they chose turned out to be less than reputable. (This same outfit is one of the two USSN uses and they are into us for more than a few bucks, too!) RCMA, being non-profit, could not function for long with little or no income! Their printer was evidently more than gracious, but they couldn't continue to operate "by the skin of their teeth" forever.

This is really a sad day. The RCMA has been around for over twenty years. The RCMA Journal was different from any of the commercial magazines, being a combination of columns on various scanner-related subjects and authoritative local frequency information that no other publication could begin to match.

The topical columns were usually excellent, although they admittedly varied in quality over the years. The number and subject matter of the columns changed over time also, as interests changed. And it was always interesting reading through the local frequency columns, even for other geographic areas; reading about the newest radio system going in, how many frequencies they had, how they were configured, what type of radios they used; little details sent in by various members. NO other magazine has done this, at least anywhere near as well.

The columns in the Journal were authored by a parade of writers over the two decades. They came and went, some lost interest, some moved on to bigger and better things. Some were with RCMA from the beginning. Almost EVERY editor and writer for USSN has been active in the RCMA.

More than a few people are unable to understand why they couldn't keep things going, rather than just, seemingly, give up. Actually, burn–out may have played a part in the Boards decision, but so did the bleak financial outlook. What they perceived to be the reality of the situation was more than a minor determining factor in their decision. Simply put, things just didn't look like they were going to get any better.

The Board at this point is trying to salvage the situation. They are genuinely concerned for their membership. What money they are able to squeeze out of the distributor, though, will have to go to pay their overdue printer bill.

People are blaming everything from trunked radio systems to the Internet for RCMA's demise. The popularity of the hobby may well *HAVE* peaked, as some assert. But there continues to be an ardent following for this fascinating pastime. The hobby attracts persons interested in Public Safety or in two-way communications in general; people with a fascination with radios or anything electronic; those interested in what's going on in the community and the blatantly nosy!

These people will probably continue to be enthusiastic about the hobby. Unfortunately, the RCMA won't be around to share it with.

Next month—details of RCMA's agreement with USSN for compensating members for the remainder of their subscriptions.

USSN

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U. S. Scanner News Reprints

Reprints are made from the best available copy. They are made on a photocopy machine and folded into 8.5"X11" format. Circle the issues you would like to order and send to address on other side with payment or call your order in with a credit card. $3.50 per Issue. AOR AR–8000 articles are in bold underline. *Indicates original copy; all others photocopied. P/R=Product Review.

1988 Volume One (10 Issues)

Jan/Feb–P/R Realistic PRO 2004

Mar–Cell Phone Freq. Layout; Pro 2004 Mods; Police Band Allocations

Apr–P/R Radio Shack Discone; Amateur Radio Bandplan; P/R Bearcat BC 600XLT; Fire Band Allocations

May–FBI; Blue Angels; P/R Regency TS 800 Model 2

Jun–Military Airlift Command; Electronic Comm. Privacy Act; Allocations: 30.000 MHz to 30.980MHz, 150.010MHz to 150.995 MHz, 406.125MHz to 406.975 MHz

Jul/Aug–Aircraft At Forest Fires; 800 MHz Trunking; Allocations: 31.000 MHz to 31.980 MHz, 151.010 MHz to 151.985 MHz, 407.000MHz to 407.975 MHz

Sep–P/R Bearcat/Uniden BC205XLT; P/R Bearcat/Uniden BC200XLT; Riding The Rails, RR Frequencies; Allocations: 152.0075 MHz to 154.995 MHz

Oct–MARS Military Affiliate Radio System; P/R GRE Super Converter; BC200/205XLT Cell Mods; McChord AFB; 800MHz; Allocations: 155.010 MHz to 157.980 MHz

Nov–P/R Realistic PRO 34; Realistic PRO 34 Cell Mods; Cell Phone Monitoring; GRE Mods

Dec–P/R AR3000; P/R AR880; P/R Antenna Specialties MON 52 Antenna; Allocations: 158.010 MHz to 158.985MHz

1989 Volume Two (12 Issues)

Jan–P/R Larsen Dual Band Antennas; P/R Cobra SR 925

Feb–G.M.R.S.; Air Refueling; Allocations: 159.000 MHz to 159.990MHz

Mar–Pro 2004 MODS; Aerial Demonstration Teams; Monitoring The Goodyear Blimps; Allocations: 160.005 MHz to160.9950 MHz

Apr–A Look At The Spectrum; Aerial Demonstration Teams; BC-200XLT Again (Sep. 88 Reprint)

May–FAA ; P/R Realistic PRO 2005; P/R AOR AR900; P/R GW 1 Pre-Amp; BC200/205XLT Cell Mods; Aerial Demonstration Teams

Jun–Aircraft Communications; Aircraft Allocations Table; BC 200XLT Update; Meteor Burst Communications; Aerial Demonstration Teams

Jul–Aeronautical Enroute; P/R Lapel Mike; Forestry Conservation; US Forest Service; AOR vs Uniden; Aerial Demonstration Teams; Allocations: 161.010 MHz to 162.000 MHz

Aug–TV Sound; Aircraft Enroute Frequencies; Aircraft Ground Control; Aerial Demonstration Teams

Sep–Aircraft Telephone; Aircraft Flight Test Frequencies; Telecommunications Act Of 1989; Aerial Demonstration Teams

Oct–Coax And Your Scanner; BC 200XLT Update; Hot Times On The Police Band; The Communications Act Of 1934; AWOS Automated Weather Observation System; Additional Aircraft Information; AMSAT; Power Radio Service

Nov–P/R AOR 950; P/R GRE Super Converter II; Monitoring Repeater Inputs; Allocation Table; RF Connectors; Portable Antennas

Dec–P/R Search and Store Module Model SS 45 For 2004, 2005; BC 200XLT Final Chapter; Cellular Information; DXing Low Band; Portable Antennas; 1989 Index

1990 Volume Three (12 Issues)

Jan–P/R PS 90 Search and Store Module For PRO 2004, 2005; Highway Maintenance (National Band Plan and Freq. Code); SF Quake of 89; Scanner Boredom

Feb–Refueling Frequencies; P/R Super Amplifier; Turbo Scan 800 TS 2 Power Fix

Mar–P/R RAC Frequency Log Program; Allocations 162.000 MHz to 173.39625 MHz

*Apr–P/R Leisure Electronics DSS 8 Digital Scrambler Silencer; Mobile Data Terminals; P/R Regency INF 7 Scanner; Telephone Maintenance Radio Service; Nicad Battery Test Jig

May–P/R Regency Informant Series; Do It Yourself Glass Mount Antenna; FBI Profile Pt 1; Airshows

Jun–P/R Radio Shack PRO 2022; FBI Profile Pt 2; Forest Products Radio Service; P/R Scan Manager Software

Jul–Aircraft Communication; Drive Up Windows; P/R PRO 2006; P/R Max 800 Antenna; Allocations 450.010 MHz to 450.990 MHz

*Aug–Pilot To Metro And WX Radar Facilities; Airshow; FBI Profile Pt 3; Allocation Table

*Sep–Cher Concert; P/R Discone Antennas; P/R Realistic PRO 36; Allocations 453.000 MHz to 453.975MHz

*Oct–P/R MON 58 Antenna; A Look Inside Your Antenna; 800 MHz Aircraft Mobile Phone; P/R AR 2515

*Nov–Alcohol Tobacco Firearms (ATF); P/R AR 1000; Motor Carrier Radio Service

*Dec–Aftermarket Products For Portable Scanners; Allocations 454.000 MHz to 454.975 MHz

1991 Volume Four (12 Issues)

*Jan–Optoelectronics Frequency Counters; Antennas And Coax; Introduction to 800 MHz

*Feb–Frequency Counters; Simple Mobile Charger/Power Cord; P/R AR 3000; 800 MHz Private Land Mobile Service; Intelligence Codes/Phrases/Etc; Scanner Repeater Mod

*Mar–Future Of Scanning; P/R Radio Shack All Band Mobile Antenna; 800 MHz Private Land Mobile Services; Pro 2004 Display Problem; Monitoring The Blue Angels

*Apr–PRO 2004 Display Backlight Fix; FCC Notice Of Inquiry; 800 MHz Private Land Mobile Services;

Trunked Systems; Public Safety Bands

May–PRO 2022 800 MHz MOD; P/R GRE Superconverter 9001; Amateur Radio And Scanning; Automated Maritime Telecommunications Systems; The Manufacturers Radio Service

*Jun–P/R Icom IC 24AT; 929 MHz Paging; P/R GRE 3001 Super Amplifier; Military Radio Systems; P/R Trident Highway Information Scanner

*Jul–Icom IC 24AT Pt 2; P/R Alinco DJ 560T; Marine Radio Monitoring; 200 MHz Band; P/R Startek Frequency Counters

*Aug–800Mhz; VHF, UHF Ducting Effect; P/R AR 2500 with software; P/R Lakeview d 16 Discone

*Sep–FCC Authorization Act of 1991; 1991 Index; Club Directory

*Oct–P/R AOR AR 2800; Everything You Ever Wanted To Know About GMRS

*Nov–Canadian Scanner Frequencies; Kansas 800MHz Plan; Club Directory

*Dec–Frequency Counters; P/R Radio Shack HTX 202; Aircraft Carrier Landings; 1991 Index

1992 Volume Five (8 Issues)

Jan–Traveling With Your Radio; P/R PRO 37; Allocation Table

*Feb–New Jersey Scanner Law Reform; P/R Shinwa SR001 Scanning Receiver; Cell Phone Frequency Plan; P/R ACE GW 2 Wide Band Amplifier

*Mar–P/R Icom R 1; Freq. Counters; Cellular Channel Plans

*Apr–P/R Ventenna Model VT 15S; Auto Racing; P/R Icom R 100; Public Safety Log Sheet; P/R Alinco DJ 580L

*May–Speed Traps; Federal Aviation Administration FAA; Aircraft Allocation Table; Military Airlift Command MAC; US Forest Service; Legalities Of Monitoring

*Jun/Jul–Amateur Radio In Space; NASA Frequencies; Nickel Hydride Rechargeables; Aeronautical Enroute Frequencies; Guide To AOR AR1000; GMRS; Frequency Search Table

Aug/Sep–P/R Radio Shack PRO 43; VHF Aircraft Allocations

*Oct/Nov–P/R Startek Frequency Counter BG 15; Catalog Sources; Flight Monitoring; Clubs and Publications Directory

1993 Volume Six (2 Issues)

*Dec 92/Jan93–Mon. The Shortwave Band; ATIS Oper.

*Feb/Mar–Government Trunking Frequencies; Military Aircraft On Your Wideband Scanner; Aircraft Cockpit During Climb Out; Airshow Frequencies

1994 Volume Seven (4 Issues)

*Sep–The Rat Police Direction Finding Catches Bank Robbers; Sleuthing Private Detective Agencies With National Frequency Listing; Antenna Gain And Directionality; Trunking And Encryption Systems How To Listen In; Parachute Jumping and Sky Diving; Jump Zones And Frequencies; Direct Satellite Scanning; Scanner DX; Introduction To Scanning

*Oct–Ground Plane Antennas; P/R Optoelectronics R10 Interceptor; Automated Surface Observing System With National List; Trunking and Search Steps; Air to Air Refueling With National Map and Frequencies; Book Review: Beyond Police Call; Astronaut Hams

*Nov–How The Signal Gets To Your Antenna; P/R Radio Shack PRO 2035; Motorola Coverage PLUS; Med Net Channels; P/R BC 200XLT; House Bill HR4922 Interception Of Digital and Other Communications; Air Traffic Control Centers With Maps; 137 MHz Satellite Band; Oil Spill Clean Up Frequencies

*Dec–Civil Air Patrol; Halfwave Dipole; Monitoring Military Satellites; SAR Search And Rescue; Personal Communications Service; State Highway Maintenance With State Frequencies

1995 Volume Eight (11 Issues)

***Jan–AOR AR 8000 Pre; Review**; Antennas for todays scanners; 1995 Police Call; The National Scanner Source Book; Weather Satellites; Phoenix Air; Public Safety; Fire Departments; Railroad frequencies for the entire USA; Finding hidden frequencies; Aviation; The Hawaiian Islands frequencies; P/R JIM M 75 Pre-Amp; FCC News; 1.6MHz Mobile Satellite Service

Feb–P/R AOR AR8000; Space communications and you; Annual guide to Air Shows with frequencies; Cell Phones and OJ; Nellis Air Force Base home of the ASAF Thunderbirds; dband Wideband and Multiband Antennas; Aviation; Alaska aviation frequencies; Tune In logging program; National car racing frequencies; P/R Opto Electronics Scout Model 25; FCC News; 911 compatibility

*Mar–P/R Radio Map; Space research frequencies; Phase inversion explained; P/R Ramsey scrambler/descrambler; Antennas, the yagi beam; Offutt Air Force Base; 800MHz public safety frequencies Alaska through Massachusetts; Opto model 25 scout revisited; Microwave mobile band

*Apr–USSN BBS Online Computer System; Aviation, Norfolk VA; UHF Satellite terminal system; Antennas for weak signals; P/R Startek ATH-10 counter; 800MHz public safety frequencies Maryland to Wyoming; Much More

*May–900MHz Cordless phone; P/R Percon Spectrum Data base; Vehicle Tracking; Aviation, Florida Keys to Virgin Islands; 136-174MHz Satellites; Scanner Antennas; Finding frequencies; February FCC public safety updates; FCC News

*Jun–US Gov't trunking; Amateur tcvrs out of band operation; Aviation; Atlanta GA freqs; Shuttle flight profile; Direction finding for scanners; Dayton 95; Call Boxes; Mar FCC Updates

*Jul–Cubical quad antenna; US Customs Service; Monitoring 800MHz Trunked systems; The10 shuttle MIR freqs; P/R AOR AR2700; Beginners corner purchasing a scanner; Special Emergency Radio Service; April FCC updates; P/R ICOM R7100

Aug–US Immigration & Naturalization Service; New Frequ Allocations; Antennas for those new frequs; FCC Call Signs; Railroad Monitoring w/ frequs; Transportation; E central MN, NW Wisconsin; SCPC Comms; Jim 51 Preamp; EMMRS; May FCC updates

*Sep–Bureau Alcohol Tobacco & Firearms Pt 1; Antennas maximize signal to noise ratio; Transportation Ptld OR; The future of space comm; P/R Uniden BC-9000; Police Monitoring; June FCC Updates; GTE Tele Go; Bk Review Cheek 3

***Oct**–Editorial "Scanning Outlawed"; Bureau Alcohol Tobacco & Firearms Pt 2; Boeing 777; Feed lines transmission lines; Scanning the Internet; Priority Function; P/R Sky Scan Desk 1300; Transportation Delaware; SARSET Search & Rescue; P/R Optoelectronics Scout 40; July FCC Updates; P/R **Pro 60–AOR 8000 expert mode**

*Nov–Editorial "Integrity"; Looking for your Federal Gov't; Lightning protection & long wire beams; Law enforcement communications security; New cordless phones; 10 commandments of scanning; Transportation: Kansas City KS & Missouri areas; The IRIDIUM System; P/R AOR SDU 5000; Public safety; Nassau County NY; FCC license applications for Aug

1996 Volume Nine (7 Issues)

***Dec/95 Jan/96**–US Bureau of prisons; Antenna system accesories; P/R Optoelectronics OptoScan OS 535; Monitoring the national weather service; Transportation Memphis TN; Space Antennas; **AOR 8000 technical stuff**; Putting a scanner in your car; Public Safety Nassau County NY; FCC license applications for Nov; Scanning like a pro; **AOR 8000 the 8k band plan**

Feb–Gov't Printing Office Access; Discone Antennas, Pre amps and more; Scan*Star for Windows; Being a Comfortable Scanner Monitor; The Other Half, renumbering the Ten Code; Transportation, Corpus Christi Area; Amateur Astronauts; Interference Filters For Your Scanner; Scanning the Hidden World of Radio Waves; Local Gov't Radio Service; FCC License Applications; Goodyear Blimps; Make a Junkbox Antenna; **AOR AR8000 Data Channel Bypass**; FCC News, Remote Sensing Satellite systems

Mar–Police Call Plus 1996; P/R M1200 Decoder Card; US Secret Service protecting the president; Beam model antennas; Scanning the Internet; The Other Half New Years Resolutions; Transportation Burlington Alabama; Phase Three Amateur Sattelites; Pro 26 Technical notes; Public Safety Catskill Region New York State; FCC license applications; FCC News Commercial mobile radio services annual report; Public Safety License Applications for February

*Apr–Aeronautical enroute frequencies; EMS Emergency Medical Service; Radio Waves; US Drug Enforcement Administration; Transportation, Oklahoma area; Diversity Communication; Antenna Basics; Message Tracker; Probe Version 2.0 Beta; Fireground Radio Frequencies; Space Shuttle and MIR Amateur Frequencies; Monitor America; 2 GHz Mobile Satellite Service; Internet: Using Usenet; Remote Scanning; Public Safety License Applications for March

*May–Annual Air Show Issue-Blue Angels, Thunderbirds, Snowbirds Part 1 Schedule With Frequencies; Air to Air Refueling; Centers for Disease Control CDC; Weak Signal Reception; Transportation: Bangor Maine Area; Scancat and Scancat Gold Reviewed; Biomedical Telemetry; Scanner Shopping on the World Wide Web; Book Review: "Scanning Secrets: Buying, Owning and Operating a Scanner; Product Review: AEA ACARS Decoder; Diplexers; Shortwave on Satellite; AOR 8000 and a Tape Recorder; License Applications for April; How to Set Up Channel Banks in Your Scanner

*Jun; US Gov't, Signal Intelligence Analysis; Conformal Scanning Antennas; Airshows Pt. 2; Public Safety Washington DC; Launch Orbital Mechanics; Transportation, Madison, Milwaukee WI Areas; Radio Manager Ver. 3.0 Beta; Law Enforcement on the World Wide Web; Cordless Phones Then and Now; Gass Conviction Overturned; License Public safety Applications for May

*Jul–US Dept. Of State; Passive repeater antennas; Public safety Washington DC; Experimental Aircraft Assoc. Fly In Convention; SIGINT Finding frequencies; Fleet monitoring systems; Transportation state of Utah; Scanware database Ver. 2.11; Weather Satellites; Auto racing in the WWW; Listeners etiquette; SMRS Channels; Improving Uniden's data skip, Seeker 800 Antenna; Public safety applications for June

*Aug–Finding Federal Frequencies; Radio Waves Explained;PRO–2030 Full Coverage Mod.; Lake Mead Recreation Area; What it Takes to be a Top Scanner Monitorist; Albuquerque Balloon Fiesta; Receiving Weather Satellites; Firefighters on the WWW; Nextel "E–SMRS"; Public Safety Applications for July

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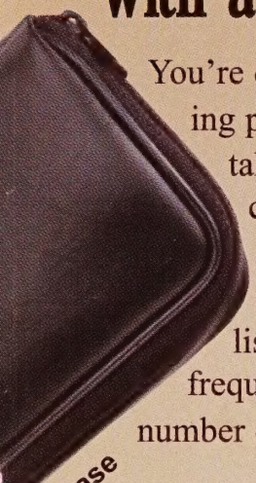

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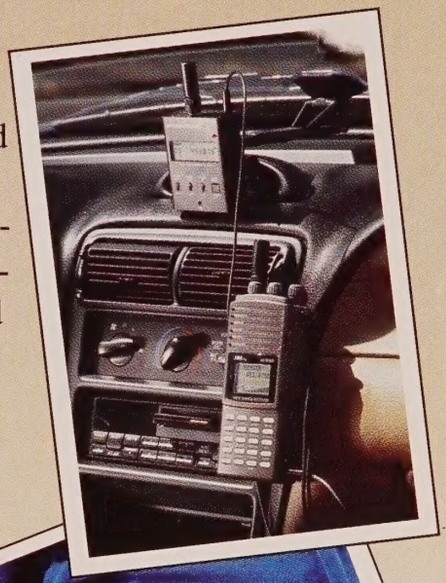

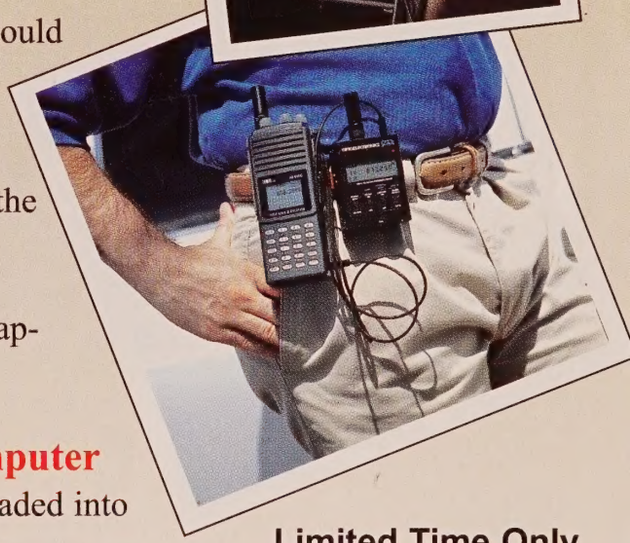

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- NMEA-0183 GPS Interface provides tagging data with location for mapping applications*
- CI-V compliant Serial Data Interface with both TTL and RS232C levels
- Frequency Recording Memory Register logs 500 frequencies with Time, Date, Latitude, and Longitude information
- Real-Time Clock/Calander with battery back-up
- Frequency Lock Out, Manual Skip, and Auto or Manual Hold capability
- Tape Control Output with Tape Recorder Pause control relay and DTMF Encoder for audio data recording
- Rotary Encoder for easy selection of menus for setup
- Internal Speaker, Audio earphone/headphone jack
- Miniature 8-pin DIN Serial Interface port for PC connection
- Relative ten segment Signal Strength Bargraph Mode
- Numerical Deviation Mode with 1-10kHz and 10-100kHz ranges
- Includes Built-in Rapid Charge NiCad Batteries with 8 hour discharge time and a Universal Power Supply

**Software for mapping applications is planned by third party Software Design Companies. Inquire about the availability and specific Companies to contact.*

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